SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[*The* MINING JOURNAL *is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.*]

No. 2254.—VOL. XLVIII. LONDON, SATURDAY, NOVEMBER 2 1878. PRICE (WITH THE JOURNAL) SIXPENCE. PER ANNUM, BY POST, £1 4s.

Original Correspondence.

TIN MINING IN LARUT—No. II.

BY P. DOYLE, C.E., F.S.S., M.R.A.S.

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The health, social mode of living, and prosperity of the miners in Larut are—comparatively with those of the neighbouring states—good, due undoubtedly to their more profitable labour. They appear to understand the benefits of co-operation, and in many of their industries there is an association of labour as well as capital—capabilities for organisation and self-government being a national characteristic. The Chinese remain Chinese in whatever nation or place they may be, the worst feature being their clannishness—their national individuality. They are the slaves of custom, doing everything by precedent, being disdainfully averse to improvement, which their peculiar religion and excessive superstition greatly aids and abets. They are proverbially industrious and enterprising—constant plodding and dogged perseverance that progresses "slow but sure," being regular in their habits, eating and resting each day at regular hours, there being no variation in their conduct. Gambling appears to be the besetting sin of the Chinese in Larut as elsewhere, and its prevention being impossible the Government has very wisely licensed the vice, bringing it better under control and restricting its action, besides affording a remunerative source of income to the state. It is practised universally among the Chinese, and they go about it with a recklessness which does not accord with their usual safe business habits. It is a rare and a curious sight to see a drunken Chinaman, none drinking enough to be called drunkards. But the habit of opium eating and smoking, more particularly the latter, among them is almost as universal as that of gambling. Many partake of the drug moderately, finding relief from the day's labour in the opium pipe at night. These negative traits of character would necessarily be incomplete without a reference to the sanguinary encounters which sometimes ensue when rival factions of the Chinese come into hostile contact, during which it is said that John Chinaman's celestial face is transformed into the visage of a demon! Before concluding this long, but not altogether unavoidable, digression it may be well to mention that these people arrive at all ports of the Archipelago in vast numbers every year, and there can be no doubt that the "celestial" will be an important factor on the Pacific Coast lines wherever hard earnest work by human hands has to be performed. It is only necessary to allude to the influence which they have already exercised in California and Queensland in depreciating European, or rather "white" labour, leaving the political aspects of the "Chinese Immigration Question" to statesmen.

The mine holdings vary in extent from one to twenty orlongs, the boundaries of which are always changing from the irregular and unsystematic mode of working adopted by the Chinese, coupled with the fact that no "register" has ever been kept of the limits or extent of the allotments. Further, the existing system of granting metalliferous land in Larut for mining operations is very unsatisfactory as regards the tenure under which such lands are held. The system for a long time in operation is a "pass," supposed to be renewable yearly, which offers no security of any value in the money market, and it is satisfactory to record that Mr. Low, H. B. M.'s Resident, is exerting his best endeavours to rectify the defect by the introduction of leases, as a security to encourage the expenditure of capital, leaving the revenue that would as a consequence accrue to the state aside. The form of lease which he suggested, and which is most likely to be adopted, requires and provides for a certain number of men to be constantly and steadily employed in working the holding, 21 years being the period judiciously selected for the duration of the lease.

The liberty which had been granted to Chinese miners of choosing the ground for their work has caused a large quantity to be rendered unfit to be worked hereafter. There having been no regulations regarding the opening and abandoning of a mine, the finest localities were not unfrequently converted into pools, and thus for the most part entirely lost to Government. In consequence also of this want of system and proper supervision which had until very recently prevailed, much valuable tin-bearing land has been covered up by the neighbouring workings, and is now comparatively inaccessible, and left untouched among the abandoned workings. The method of starting a mine in Larut is somewhat as follows:—The "undertaker," after obtaining a claim license, is frequently unable to provide more than the Kongsee and smelting-houses, tools, and pumping machinery, besides, of course, collecting or importing the gang of coolies. In such cases he has to resort to an "advancer" for the working expenses, including the food and necessaries of his coolies. The conditions under which the advancer agrees to supply these requirements vary very much, but are, in some form or other, embodied in the following:—(1) Obtaining a tenth of the gross proceeds of the mine, in addition to a certain fixed high rate of interest—frequently 36 per cent. per annum—on the value of the articles supplied; (2) receiving the privilege of taking over the output of the mine at $2 per bhara—equivalent to about 4 per cent.—below the ruling market rate, with an enhancement—corresponding with the interest mentioned in 1—on the bazaar rates of provisions and necessaries; (3) purchasing the speculator's claim, but keeping his interest alive in the working for a tenth of the yield, making his own arrangements with the coolies, and appropriating the residual balance, if any. It sometimes, however, happens that the undertaker and advancer are one and the same individual, which, of course, tends greatly to simplify matters.

All payments to coolies go through the hang kong, or head coolie, who is the middle-man. As might be expected, the coolies' wages are paid differently, according to circumstances—some by a share in the results, others by petty contract or task, and some few by monthly wages. Individual earnings range from $6 to $8 per mensem, food and necessaries costing $3 to $4, leaving apparently a comparatively large balance, but, from the objectionable custom in vogue of only adjusting accounts once a year, the unfortunate cooly is compelled to exist on supplies advanced at an enormous increase on the bazaar prices, and as a consequence receives very little, if anything, at the final settlement. The miners' dietary is very simple, and generally consists of rice, with a little dried fish and a small quantity of vegetables, with pork on feast days. This is the usual messing provided for them at the kongsies, which are supplied with any additional luxuries from the stores in Thaipeng, Kotah, and Kamunting—the articles most in request being opium, shamshu (spirit distilled from rice wine), cakes, fruits, &c. In some few of the kongsies there is a shop on the premises, and in, round, and about the workings small vegetable garden plots have sprung up—a pleasant relief to the monotony of spoil bank and pit of which the mining area is composed.

The following are the current bazaar prices in Larut, which may possibly interest English readers:—Opium, per ball of three catties, $18; salt fish (small), per picul, $6; rice per picul, $4·20; oil, per picul, $16; trowsers (each), 50 cents; coats (each), 65 cents. The mine prices being from 30 to 70 per cent. in advance of these. There can be no doubt that the advancer's profits are great: but the risk which he has to undergo at times is also very great in proportion. The exact relation between undertaker, cooley, and advancer has never been defined, and is altogether in a very unsatisfactory condition—the custom varying in different mines, and even in the same mine at different times. The system of paying regular wages to the coolies is gradually but surely coming into force, and the tokays (head men), with few exceptions, appear to think that it is the best plan of working after all—Government being powerless for good under any other system. It cannot, however, entirely supersede the system of trucking, by which the advancer, as a rule, enriched himself by despoiling the coolie: there will evidently be less liability to the complications which always bewilder the poor coolie, who will have more control over his earnings, and be left to his option as to the store which he may be inclined to patronise for supplies, or the disposal of his money generally. It has been correctly remarked by one who knows the Chinese, and has seen them work, that more than any nation it is necessary they should have a personal interest in their work. The nature of the ground in hand precludes the universal adoption in the mines of the system in force in Europe and elsewhere of letting out the work in small portions; besides, an insuperable difficulty would be that the Chinese would not undertake such work without an advance, and if they found that they had miscalculated a contract they would not work at all. A Mines Regulation Act would by no means be a premature measure to introduce into the country. The extension of mining interests at the present accelerating rate will before long render it absolutely necessary. By some former rules for the working the mines—more honoured in the breach than the observance—the hours of working were fixed at 6 to 9 A·M, and at 1 to 4·30 P.M. But this time was neither adhered to nor enforced. The working day varies from six to eight hours, according to agreement, the coolies having the option working overtime outside these hours, but under the restriction of selling the output thus obtained to the advance, besides giving him a fifth of the result for the use of implements, or rather mining tools and plant. This rule being evidently unfair, open to abuse, and in other respects objectionable, is fast dying out, being avoided by special agreement. There are 16 privileged holidays sanctioned by custom in the Larut mines.

Although the Chinese in general are largely experienced, active, and indefatigable in working their mining grounds, their mode of operation is still very imperfect, and susceptible of great improvement. The *modus operandi* of tin mining in Larut may be presented under four heads—firstly, excavating or getting the tin ore; secondly, pumping, or keeping the excavation free of the water which would otherwise retard progress; thirdly, washing or separating the ore from the earth, clay, sand, and pebbles with which it is found embedded; fourthly, smelting or the reduction of the ore to the metallic state. The first operation in getting is to remove the superincumbent earth. The Chinese miners in Larut generally take one side of the pit, and carry it (a vertical face) before them in no fixed direction, and only following that which gives them most tin with least labour, irrelative of ulterior consequences. The tools employed are the universal chankal or hoe, and for hard ground a sort of pickaxe. The spoil is carried across and laid on the opposite side till the ore-bearing stratum is reached; this is a most tedious operation, the earth being conveyed in baskets suspended from the ends of a stick resting on the shoulders up notched beams (Chinese ladders) to the surface, and then along to the place of deposit. The quantity carried does not average more each trip than a cubic foot of clay soil. The pay or wash dirt is taken in a similar way to the place where it is to be washed. The plan of stripping in stages of decending level ahead of the working face may now in a few instances be seen since European supervision has become something more than a name in the workings. Government control is also exercised in preventing the formation of spoil banks on unworked land (to which objectionable practice a reference has been already made in preceding paragraph), and insisting on the filling in of the excavation behind as its extension progresses forward. It has been ascertained that 100 men steadily employed can work two to three orlongs of tin land in a year, and which may be verified from a succeeding paragraph produce 250 bharas of metallic tin.

[*To be concluded in next week's Journal.*]

NEW SOUTH WALES COAL.

SIR,—One of the best customers for our celebrated Newcastle Wallsend coal is New Zealand, and as there is a freight of from 15s. to 20s. per ton between the two colonies, there is, of course, so much protection for any coal worked in New Zealand itself; yet so great is the superiority of the New South Wales, and natural desire to deal with themselves in preference to us, the local New Zealand Company at the Greymouth, although said to be in working order, cannot raise sufficient capital to go on working, and is now actually trying to sell the whole property in Sydney, New South Wales, in default of their own colonists coming forward to try and keep it going. Great things were expected from this New Zealand mine when it was first discovered, and every effort naturally made to "push" it in its own colony, and the fact of its present position speaks volumes as to the real value of the Newcastle seam, which successfully overcomes it in its own markets, although handicapped with 1200 miles of carriage.

In the present state of the English money market there will probably be several attempts to dispose of coal properties situated in these colonies, and should such come before any of your readers who are intending investors, let them bear in mind the fact that the only real safe coal—with a certain market and an assured character—is the Wallsend seam, and to be guided by no report as to quality and locality unless it be signed by the Government surveyor here, and stamped with the seal of the Mining Department.

Sydney, Sept. 5. R. D. ADAMS.

NEW MEXICO—No. IV.

SIR,—To report to you from a country like this, in the centre of a large continent—excluded from direct intercourse with the high road on which English interests walk in preference to all others, from the sea*—has something discouraging in itself, and to report from here about copper-producing interests at a time when the Crown of Great Britain has added another jewel to its splendour in the Isle of Cyprus, the very name of which was derived from the metal *cuprum*, which Greeks and Romans nearly exclusively derived from this island—to report on copper at such a time from this place would command but very little interest, unless something striking, something extraordinary, could be said and sustained. This extraordinary I need not search for long. It is right before my eyes, it probably is similar to what made Cyprus once famous—immense deposits of copper ores on the surface. And what kind of ores! Oxygenated ores yielding an average of 14½ per cent. in inexhaustible quantities, ores requiring one smelting (no roasting) for producing black copper. The deposit being on a Mexican land grant, confirmed by United States Congress, has none of the dangers connected with United States mine patents, but may be handled by real estate titles. At an earlier opportunity the deposits have been described in this Journal, and to-day I would not have mentioned them again but for the fact that during my exploration I discovered lately in its very vicinity a good vein of excellent stone coal—anthracite by quality, lignite by geological age.

Bordering the lands belonging to the said land grant towards the west we ascend the Sandia Mountain, a district entirely unexplored until your correspondent visited it. The east slope of this mountain chain is covered by sedimentary rock. Granites crop out on its western declivities. The foothills east are calcareous (greensand), and one by one in ascending the outcrop of the lower formations are passed down to the carboniferous and silurian, in which both the limerocks and dolomites prevail. In the former, about half-way to the summit, a mineralised belt is recognisable, which if not carefully taken up will one day renew the hostile strife of theories as to one or more veins. It shows copper and lead ores both auriferous and argentiferous in sulphide ores, hence concentratable. This mineralised belt is productive also of something more rare than the useful minerals in this territory—water. Amongst others, a stream filling a 6 ft. × 10 ft. space emanates from the rock, and flows a mile or two down more than 400 feet, and then disappears again, meanwhile offering the occasion for water power sufficient for a large establishment. At this elevation frequent rains fall, and the vegetation is tropical. It is, altogether, a lovely spot on God's earth, in a paradisian climate, and a whereabout an enterprising man of poetical tastes may combine the useful with the beautiful, and create an Eden around him. Americans would not trouble him, there are none; and the only evil spirits would be the Mexican caballieros on their burros, being always in need of something more than they are entitled to. The spot may be had for the trouble almost to inquire for it, like so many others in this territory, unless situate on old land grants, as the copper mines are. Here nobody cares for such things. The only shape in which mining ever has been practised is placer gold mining, and thus it is to-day, with a thorough neglect for everything else. F. M. F. CAZIN,

Copperfield, Sept. 18. Mining and Civil Engineer.

* The next harbours to this place are La Libertad and Guaymas, on the Gulf of California. Their air line distance is about 500 miles, but the road by Las Cruces and Tucson is about 600 miles to La Libertad and about 650 miles to Guaymas, the latter road being the better one. Freight over this road would amount to 6½ cents. Black copper is produced here at a cost of 8 cents per pound on a small scale in one smelting with charcoal.

DEPRECIATION OF SILVER.

SIR,—About two years ago, when silver suddenly fell to 45d. per ounce, and the great bonanza, Nevada Mines—the Consolidated Virginia and California—was pouring out their wealth at the rate of 600 tons of ore per day, there was naturally a fear that the value of silver was a thing of the past. I at that time took the liberty of addressing you on the subject, and told the public to fear not, as the grand old metal would still keep its ground, and although the Virginia Consolidated and California bonanzas might be reckoned amongst the marvels of this age, yet we need not fear those vast deposits would have their limits; and to bear me out on this head I only need to refer you to the annexed list. The figures tell their own tale—that at the present moment most of the Comstock mines have up-hill work. In my former communication I recalled the palmy days of the other mines on the Ledge, but on reaching "their 2000 ft. levels," with torrents of water, atmosphere unfitted for human beings to labour in—it is only a few weeks since three miners were stifled to death at the 1900 ft. station, whilst engaged in removing a piece of machinery in an adjoining mine (the Gould and Curry)—with these difficulties to combat with the best of them have passed into the non-paying state, added to which the lode has become poorer, and from all accounts the two rich mines in question are experiencing the same changes. The fall in the price of shares tells its own tale. The public may rest assured that there is a screw loose somewhere.

AMERICAN MINING STOCK.

VARIATION OF PRICES FROM OCT. 26, 1876, TO JULY 27, 1878.

Date.	California.	Virginia Consolidated.	Ophir.	Mexican.	Gould and Curry.	Savage.	Chollar Potsi.	Hale and Norcross.	Yellow Jacket.	Overman.	Best Belcher.	Bullion.	Crown Point.	Balch.	Total amount.
1876	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$
Oct. 26 ...	58¼	51½	53	28½	15	14	78	8½	24½	82	45¼	36½	12¼	18½	526
1877															
Aug. 11 ...	27½	29½	17	10¼	9	6¼	29¾	4·80	8¼	22	16½	7¾	4·10	—	—
Sept. 1 ...	29¼	33½	16½	10¾	9½	7⅞	35¼	5·50	11¼	18½	18½	7⅝	3·80	—	—
Dec. 15 ...	29	21¾	50	14¾	9¾	12½	41⅝	10¾	11¾	24	20½	6¼	7·50	—	—
Dec. 29 ...	27⅞	23	54½	15¾	9½	12¾	36¼	10¼	10½	22½	20⅛	6⅜	7·15	—	—
1878															
Jan. 19 ...	26⅜	22⅜	51	14¼	8⅜	11¾	33¼	9¼	9½	19¼	18¾	4·80	5·50	—	—
Feb. 12 ...	27	23¼	53	13¾	8⅜	11⅝	32½	10	10¾	15⅜	18¾	4·05	4·75	—	—
Feb. 16 ...	27⅛	22½	52¼	13⅛	8⅜	10⅝	32	10	10¼	14¾	17¾	3·75	4·80	4·40	—
March 2...	29¼	32¾	54½	13⅞	9¼	12⅛	33	10¾	11¾	15¼	24	5·75	5·75	4·65	—
March 9...	30	22⅝	53⅛	13⅛	8½	10⅛	32⅝	9⅛	10¾	14¼	21½	5·25	5·40	4·50	—
March 23.	28	20⅛	33	12⅜	7	8¼	28	7¾	8⅛	13¼	18⅛	5	5·12	3·25	—
April 13...	29¼	19¼	27¾	9¼	5½	8¼	23⅛	7¾	6	9¼	15¼	3·80	4·15	2·40	—
April 20...	27½	16½	28⅝	9⅛	7¼	11½	28	9¼	6⅞	12¾	16	3·40	4·30	3·90	—
May 4 ...	25⅞	14¼	32½	9	6½	9⅜	27⅜	7¼	5⅜	9¾	13	3·75	3·35	3	—
May 11 ...	25	13¾	28⅛	8⅜	5⅛	9⅛	25⅜	6⅜	6⅛	9	13	3·60	3·10	2·70	—
May 18 ...	21¼	13	31	8	5½	8⅝	25¼	5¼	7⅜	8½	12½	3·45	—	2·40	—
July 13 ...	13½	9¼	47⅛	14⅛	6½	11¾	25⅞	6⅞	8⅛	14⅜	4·05	6·75	4·40	—	
July 27 ...	7⅞	7¼	39½	12⅛	6¾	10	29	7⅛	9¾	10½	14⅜	4·70	6·88	4·30	171

N.B.—The share prices are in American dollars. The quotations are taken from the Virginia Enterprise, Nevada. On reference to the last column of the table the difference in value of the stock from Oct. 1876 to July 1878 will be seen.

It is pleasing to see from Messrs. Pixley and Abell's weekly report that silver has kept its ground about nan a-million of ounces per annum—I am persuaded that no very great amount of time will elapse before we see it at the old price again. My reason for thinking that the price of silver will have an upward tendency is that as soon as Congress meets in December at Washington a resolution will be introduced into the House of Representatives, and pushed forward as rapidly as possible through both Houses, favouring an unlimited silver coinage, and I know from experience that the working masses of the United States believe very thoroughly in remonetisation of the white metal, therefore in the event of the Bill passing it will hasten the price of silver far beyond its present value.

In conclusion, I note that there has been a great stir of late in regard to the fabulous riches of the Isabelle and Exchequer Mines. I have read the many statements in regard to their richness. I was well acquainted with the very first locators of these marvellously rich concerns (?), situate in Silver Mountain, Alpine County, California. I am a true supporter of all legitimate mining, but I hope, Mr. Editor, that you, and all others interested in gold and silver mining of the Far West, will prevent, if possible, our countrymen's money being wasted in the senseless manner as followed hitherto; indeed, before embarking in these grand speculations I would strongly advise all capitalists to get competent advice from some practical gold and silver miners who have spent years of their life in developing the gold and silver wealth of the Far West.

Oct. 28. LISKEARDITE.

CANADIAN MINING NOTES—No. VII.

SIR,—The difficulty in Canada with regard to mining enterprise is the want of capital. Had we men in this country who had made money by mining, and had been successful in mining, a good deal of that money might find its way back to the source of its origin, and go in to develope other mines, but in this country the people have had so little experience in mining that they are exceedingly chary about going into it. Many of them think they have had experience enough, in losing money at least, but I will leave it to the intelligence of any mining man whether from such efforts any other result could be expected. I shall briefly describe the efforts. First, after finding good indications on the surface, they go down on a shaft about 25 ft., and then stop work, and wonder why they have not immediately struck a bonanza. Now, if the bonanza had been struck at the depth of 25 ft. they might perhaps have expected that what Nature had done in one part of the world she would also do in another part, but when it is a known fact that the Gould and Currie, Best and Belcher, and the other mines that make up the Consolidated Virginia were worked 437 ft. down after the vein gave out without a trace of silver ore has an idea of the pluck, energy, and perseverance of these holders.

Here, in Canada, the Croesus Mine assays $75 per ton in silver and 500 lbs. in lead to the ton of 2000 lbs., besides $6 a ton in gold, and yet the work is stopped for want of funds at the distance of 25 ft. from the surface. To be sure the vein has narrowed for awhile, but is about extending again, and even if one could only find a thread of silver it would show little perseverence to give up at the distance of 25 ft. However, it is expected that some Englishmen or Americans will take hold of the matter and prosecute the work with energy and perseverance. The Conservative party are now taking steps to ascertain what the undeveloped mineral resources of the country may be, and the new Government expect to be able to lay before Parliament a well devised scheme for developing our minerals.

The directors of the Exhibition lately held in Toronto seem to have taken little interest in the mineral resources. Prizes were given for almost everything under the sun that we could possibly make, yet for the raw material—the gold, silver, copper, lead, atatite, and graphite—most inadequate prizes, or none at all, were given, and the whole arrangement of the prize list betokened great ignorance or else great neglect, or both. Some of the judges wanted the lead specimens to be separated from the silver specimens—a rather difficult thing when the lead and silver were in the same rocks. However, we expect to have matters arranged in a better manner before the end of next year, and hope the directors will increase the prizes. As the fair is to be held at Ottawa, and immense quantities of apatite and other minerals have lately been discovered there, no reason appears why they should not give as large prizes for minerals as for horses and cattle.

The news from the Thunder Bay district is encouraging. Silver Islet is turning out very well, and the Duncan Mine is also turning out well. The new Government will probably push the Pacific Railway, and obtain a large loan in England for the purpose of

building it. It will cost (say) $100,000,000; now, on the strength of an Imperial guarantee at 3 per cent, the Dominion would have no difficulty in obtaining a loan at 5 or 6 per cent. for the sum of $34,000,000. Well, with that amount of gold as a basis we could issue greenbacks to the amount of $100,000,000, which is the amount required. There is no reason why the banks should get the benefit of the circulation; the whole public should have it. We should be justified in the issue of greenbacks or legal-tender notes on the above basis, and it would not have the effect of decreasing our credit. Then would be opened one of the most fertile and most salubrious countries on the face of the globe. There the death-dealing yellow fever comes not—there the land produces between 40 and 50 bushels of wheat to the acre. Vast fields of coal, vast fields of ironstone, immense lakes full of fish, prairies where cattle and horses can live out all winter. That is the country which is called the North-West of Canada. It only requires a good, able, strong, enterprising Government to push forward the Canadian Pacific Railway, and fill the country with people, and the whole world will be astonished at our undeveloped wealth. That Sir John A. McDonald and the men likely to become ministers will do it was the hope of the Conservative party, and there is no reason to expect they will be disappointed. Who the new ministry will be cannot now be said, as they have not yet been chosen. Some of the following names, however, may be considered certain:—Sir John A. McDonald, Dr. Tupper, Mr. Tilley, Hon. William McDougal, Hon. Alexander Morris, Mr. Thomas White (editor of Montreal Gazette), Dalton McCarthy, Q.C, Mr. Ryan (of Manitoba), and Judge Coursol (East Montreal). There are thirteen ministers in the Dominion, although in the United States there are only seven, yet the country is so large that all are well employed if they only attend to the business of the country.

The subjects which mining men will be chiefly interested in will be these. What will they do about developing the iron industries? Will they put a duty on foreign iron and steel, or give a bonus to our furnaces? What will they do about enlarging the staff of the Geological Survey, and dividing the dominion into several districts for geological research, appointing geological and scientific colleges and museums in each province, and having one central geological university? What will they do about opening up our silver mines, our apatite mines, and many other undeveloped mineral resources? These are the questions which the people look to the new Government to answer, and which is assumed to be part of the national policy. Would a book published on the mineral resources of Canada pay, is a question which has often occurred to my mind, and I have no doubt some reader of your valuable Journal can give me the information. BOURNONITE.

As I close my letter, my attention is called to an article in to-day's Mail of Toronto, and as it is *apropos* of the subject of free trade and protection, I append it. We are awfully amused with the mistakes made by English writers, who have little or no knowledge of Canada. How they lecture us! How they instruct us! Perhaps if I should go to London and instruct them on English matters they would be amused also. I have no doubt some of my notions on English affairs would be as valuable as their notions on Canadian affairs." B.

ECLIPSE GOLD MINING AND QUARTZ CRUSHING CO.

SIR,—In the Journal of Oct. 5 you were kind enough to insert a letter of some length and of importance to the shareholders in the above company. In answer to the same I observe in your issue of the 19th inst. a letter from Mr. Potts, containing two extracts from communications received from Prof. Rickard; but if Mr. Potts had those remarks contradicted further I believe he would have found written under a hasty and wrong impression, as he himself afterwards told me. Does Mr. Potts suppose the shareholders will be satisfied for the loss of their money and property by his publication of paltry matters of mere private feeling? I am not a little surprised Mr. Potts should stoop to such small defence, and, judging from a paragraph in your Journal of last Saturday, I am not alone in my views; and I trust if Mr. Potts writes again he will keep to the truth, and not wander from the subject, as truth is all I want. I again assert the horses and buggy were not kept at the Eclipse Company's expense—the three belonging to the company were in constant work on the tramway, &c., leaving not a single animal for inspecting and daily business, averaging from 10 to 20 miles daily. Considering Mr. Potts acted under such very able advice the result seems almost incredible, being a miserable failure, and gross waste of capital and property, for want of the most commonplace management; but the colleague and adviser referred to, I believe on good authority, has had no experience in gold mining whatever, although a director of numerous companies, they are not such as would be of any assistance in management of gold mines. The utter disregard to the "sensational telegrams and letters" referred to by Mr. Potts was whilst they were "under the consideration of the board" the very means of the shareholders losing a good property, and not receiving fair dividends for their investments—that Mr. Potts seems to think quite a secondary consideration; but I must say his cautious actions were totally without judgment where prompt measures were absolutely indispensible, and ruin the result.

With regard to any doubt thrown upon the truthfulness of my statements I shall be happy to place proofs of such in the hands of any shareholder who may ask for the same, and, although I have not the pleasure of so long or intimate an acquaintance with them as Mr. Potts, I am convinced that facts and truth must come to the front in spite of this. If Mr. Potts will consult the late managing director (whom he meets at least once a week) on the subject of assays, &c., he will find that I was obliged to get assistance to carry out that department when I was put in temporary charge of the property; also that I was so much overworked that that director thought it necessary to relieve me entirely of the accounts, and he appointed Mr. Beaman in my place.

In conclusion, I beg to append a few extracts from letters received by me from Prof. Rickard, which will go to show how utterly at variance with the truth Mr. Potts' information is on most matters in connection with the Eclipse. CHAS. S. NELSON.

Kilburn, Oct. 29.

EXTRACTS OF LETTERS RECEIVED FROM PROF. RICKARD.

San Francisco, Sept 18.—A few days ago Hooper received a cablegram from Bluett—"Inform Rickard nothing can be determined until his report received.' To-day, at Mr. Rothschild's request, I cabled for 1000*l.*, with which to pay off so much of his account, and in return he has signed an agreement to abstain from legal proceedings, remove all attachments (but Eudey's), and endeavour to obtain an amicable arrangement with all other creditors.—W. T. RICKARD.

San Francisco, Sept. 23.—I have an appointment to meet them to-morrow morning, when I shall hear more of their intentions. Eibershultz spoke of making an offer to buy the property out and out. I am very sorry to hear of the awkward predicament in which you are placed, as I can do nothing now than sympathise with you at present, not having a dollar at my disposal. The company cabled me on the 20th, enquiring about profits in case they should pay off liabilities: if I could sell or form a company in California—and how long safe—meaning, I assume, redeemable. I replied to the best of my ability, and the next day received another cablegram—"Rickard return England." To this I replied "No money, can't," &c. We will see what the next few days bring forth. I do not feel inclined to leave until matters are placed on a more satisfactory footing, and both Mr. Johnson and Hooper are of the same opinion, although in three weeks hence my time in California will be up, according to my agreement with the company. I hope to have more cheering intelligence for you all in my next.—W. T. RICKARD.

San Francisco, Sept. 29.—Since writing you on the 23rd inst. I have had no communication from London, either by wire or letter. There should be a letter from Bluett for me at Independence about 25th. It may probably throw a gleam of light on the gloom in which we are at present enveloped. Eibershultz threatened bankruptcy up to the 27th, when he decided to attach in the customary manner. He will pay off all the small attachments, and contest Eudey's claim on behalf of the company, and, of course, in his own interests should we fail to redeem. As soon as I have any definite instructions from London I will let you know; but I am beginning to think that Mr. Hulbert or some other director may be on their way out, with full power to deal with our difficulties. Keep up your spirits, and keep a good face on matters, &c.—W. T. RICKARD.

Oct. 9, 1877.—Mr. Bluett desires me to cut down all possible expenses, and with that view requests me to dispense with Mr. Beaman's services. You will, therefore, please inform that gentleman that he is at liberty to leave whenever it will suit his convenience, as I do not see any prospect of retaining him nor any chance of paying his arrears of salary any sooner by his remaining at the mine. With regard to myself Mr. Rickards writes, under same date—"should operations be resumed I will do all that lays in my power to reinstate you on such a good footing as you may deserve, and which I doubt not will be creditable to you."—W. T. RICKARD.

San Francisco, Oct. 12, 1877.—Eibershultz does not seem to have informed you that an offer has been made to him to lease the mine and mill for two years at $500 per month, also that Eudey had offered to withdraw his claim on condition of being allowed to work mine and mill three months. His letter to Rothschild with this information is now on its way to London.—W. T. RICKARD.

San Francisco, Nov. 10, 1877.—I am glad to hear you have succeeded in obtaining bonds for the transfer of the cases, but regret to say that I have no money at my disposal for fees or anything else. All I can do is to keep the company informed of the efforts we are making to preserve their property from disruption, and trust to their common sense to sustain us with funds.—W. T. RICKARD.

Tucson, Nov. 16, 1877.—Rothschild tells me there is a sort of company being organised to buy up the debts against the Eclipse at 50 c. or 60 c. to the dollar. I have written fully to the board about it, and strongly recommended them to accept Mr. Rothschild's offer to compound, and after clearing off liabilities endeavour to dispose of the property to the best advantage, if indisposed to risk a renewal of mining and milling operations. I wish you well through your troubles, &c.—W. T. RICKARD.

ECLIPSE GOLD MINING AND QUARTZ CRUSHING CO.

SIR,—In the hope that I may not have to trouble you to insert so much apparent useless correspondence on the above company again, and that Mr. Potts will now be satisfied that what I stated at the meeting was backed by vouchers, I will conclude by thanking you for the space you have kindly given me on all occasions. I trust Mr. Potts will not so flatly contradict when writing again, and rely more upon himself if he does so, and not on the personal friendship he may have with the shareholders. Enclosed I beg to hand copy of a certificate. CHAS. S. NELSON.

COPY OF CERTIFICATE REFERRED TO.

Chas. S. Nelson, San Francisco, California.

DEAR SIR,—In compliance with your request, I hereby state that I did not dismiss you from the employ of the Eclipse Gold Mining and Quartz Crushing Company; but, on the contrary, left you in charge of the property when I returned from Inyo County, Sept. 7, 1877, pending the decision of the board of directors as to future operations. W. T. RICKARD, F.G.S.

Tucson, A.T., April 14.

MINING IN THE PROVINCES OF PALENCIA, SALAMANCA AND VALLADOLID.

SIR,—The mining industry in these provinces remains about stationary, being reduced in the province of Palencia to the exploitation of the eastern extremity of the coal field, and the extraction of a small portion of ore from the calamine mines; and that of Salamanca, to the extraction and exportation of a very small quantity of false topazes from Hinojosa, without any new discovery in mineral wealth or advance in the methods of benefiting or manufacturing the ores since 1874.

The causes of this inertion in the development of the mineral wealth of these provinces, so abundant in minerals—are, first, want of capital, since foreign capitalists hold back, from causes unknown, and which, unfortunately, are not peculiar alone to those provinces, and home capitalists seek in other negociations a more advantageous employment for their capital, requiring less attention and study, and offering fewer eventualities and risks in the greater number of cases; second, the absence of a spirit of association throughout Castile; and last, but not least, the necessity of advantageous ways of communication, which would permit the carrying under fair economical conditions products to their consumers or general exporting and importing ways to carry to the distinct producing places the necessary auxiliary elements.

The exploitation of only the eastern part of the Palencia coal field is owing almost exclusively to this last cause, since only this part of the field has a section of railway combining it with the North Spanish Railway, as well as with that of Alar to Santander.

Having lightly noted these indications respecting the position of mining in these provinces, and without entering into detailed statistics of the product of each separately, it seems opportune to mention a particular which has justly claimed attention, because of the considerations raised by it respecting the geology, and historical [illegible] of these provinces, especially that of Palencia, and which, though strictly speaking cannot be looked on as belonging to, or be classed with, mining industry, nevertheless is not completely out of place in this summary, since it has to treat in its greater part of substances embedded in the superficial layers of the earth's strata, and destined to be converted into chemical manures. We refer to the exportation of bones, modern ones or ancient, which are found buried in the superficial strata. This business was commenced years ago in the province of Palencia, and has to-day been extended to those of Valladolid, Burgos, Salamanca, Leon, and Zamora, as well as to some parts of Arragon and Navarre.

It is surprising that since agriculture is the principal (about the only) industry of Castile foreign exportation of enormous quantities of substances containing the principal elements of the earth's fertility is looked upon with indifference, more especially so as these have to be again purchased from the manufacturers, and imported at an exorbitant price, thus giving the foreign manufacturer a profit, which certainly should remain in the country.

With the exception of a relatively small portion of recent bones those that are exported are found in a sedimentary deposit, composed of thin beds of yellow or brown clay, interlaid with others of sand, coarse gravel and loam, and a description of grey earth, which from its aspect appears to be ashes, and, owing to this, these deposits are vulgarly called "ceniceros" (ash-beds). In other places it consists only of a layer of loose and shifting gritty clay, wherein the bones are found, although at all times involved in ashes. The whole of these strata are covered by a layer of vegetable earth, and lie on a quaternary alluvial deposit, generally of little thickness, formed of yellow or brown clay, and brown quartz pebbles, which probably have been carried down from the mountain ranges, which lie to the north, and north-west of the province of Palencia, and which belong to the carboniferous and Devonian formation. The bones are found in the depressions and on the sides of the table-land of tertiary formation. Wrought and unworked bones of the deer have been found amongst them, as well as those of the horse, ox, goat, sheep, wild boar (also tusks of this animal, both wrought and unwrought), dog, and of a few gnawing animals (roers). In their greater part the species appear to be identical with those of the present day; but others are those of extinct species, such as the bones of an immense deer, and those of an ox with an enormous cranium, and which might be the "urus" or primogenitive ox (bos primigenius). The whole are found at a depth which does not exceed from 1 to 3 metres from the surface. They are found intermixed with tools and ornaments made of deer's horn and bone, as well as with articles of bronze, gold, and iron, and with pieces of coarse as well of fine pottery and glass; and in one place—Paredes de Nava—with small pieces of wood almost carbonified. Some of the pieces of deer's horn are worked so cleanly in the salient angles that they seem to point to, and prove the use of, steel in their working, whilst others appear simply worn to a point, or roughly prepared as if to serve the purposes of a hammer or the handle of a tool; round pieces of the same material have also been found, in the forming of which the lathe has evidently been used, and stiles or points which were probably used by the Romans to write in their wax tablets; needles, made of bone and metal, and others of deer's horn, have also been met with, which seem to have been used for sewing skins—as well as bronze rings, buckles, pieces of glass in the form of prisms, trinkets, amulets, and playthings; among them small balls of burned clay (like the marbles of schoolboys), &c., all of which—though by their forms appear equal to those found in other places, and attributed to the polished stone, bronze, and first iron age—still are (many of them) exactly equal to those extracted from Roman burial grounds.

Together with pieces of coarse pottery, common to all ages, pieces of saguntine ware are found, notable for their fineness and colour, and for the artistic taste exhibited in the medallions and ornaments which cover them. Celtiberous and Roman coins have also been found, as well as various coins of the middle ages—also swords, daggers, picks, and other iron tools, the whole being intermixed at distinct depths, without any order in their superposition, and therefrom arises the difficulty of classifying these deposits, as to the time of their formation, the state of the respective civilisations, and the ages of all.

In the same layers and at the same depth as where the bones and the aforementioned objects are found, and in a depression close to the Palencia north-west station, Roman cemeteries have also been found, some formed of stones of the second to the fourth centuries of the present era, and others simply formed of tiles placed one against the other, enclosing skeletons of children.

Such is the confusion among the objects which these deposits present that amongst the bones of deer, wild boars, &c., a Christ of metal was found at Cisneros, a few polished stone axes have also been found Melgar, Paredes, and the Sierra de Cervera.

It is difficult to show cause for and explain the formation of these deposits; if, on the one hand, their existence in alluvial soils and formations at the bottom of valleys and depressions, as well as in the declivities of the rising grounds, and the general confusion in which they are found, seem to point to a general inundation as the collector and depositor, which—sweeping the lands where all might have been dispersed—accumulated them in the depressions and elsewhere; on the other hand, we find, in opposition to this hypothesis, that there is no record of any description of such a general cataclysm, which should have occurred in a relatively modern period, if we take into consideration the date of many of the objects found, and the not less important fact that the greater quantity has been extracted from grounds wherein important Roman towns existed. Let it be as it may, sixteen years have now passed since the exportation of these bones was commenced, and during that period, in times of drought and seasons of bad crops, their extraction, collection, and sale have proportioned great relief to the labouring poor of the kingdom of Castile. JOHN ARTHUR JONES.

Madrid, Oct. 4.

MINERAL CAPABILITIES SURROUNDING THE PROPOSED RAILWAY BETWEEN MEALSGATE AND HESKET NEWMARKET.

SIR,—Now that the question of a railway from Mealsgate to Hesket Newmarket is agitating the minds of some of the shareholders of the Maryport and Carlisle Railway, it might be interesting to enter into some of the advantages that would be derived if such a line were made. In the opinion of the writer, also that of other mining engineers, it is not considered presuming to compare the easterly portion of the county with that of the westerly division of Cumberland as regards mineral capabilities and sources of a paying traffic. What the present position of West Cumberland would have been had it not possessed the hematite and coal deposits is not hard to conjecture, but to what extent those valuable bodies of mineral would have benefited the district had not railways been made is a question that may be asked and answered. Cumberland would have been comparatively unknown, with all its mineral wealth, had not the Cleator and Egremont, Furness, and Maryport, and Carlisle Railway offered a means of cheap transit—cheap, at any rate, in comparison with the labour and expenses of cartage. There is little doubt had not these lines been made no such development of mineral riches would have taken place, and the burried treasures of West Cumberland remained bosomed in their mother earth. We may, therefore, regard the above companies (especially the Cleator and Egremont) as parents of the prosperity of our county, and the means of assistance to the mine owners—in numerous instances to their approaching positions as millionaires.

The development of the red gold of West Cumberland has been the means of employment to many thousands of the working classes who, but for their having been engaged in such an industry would never have attained to the position of prosperity they some time ago occupied; but this has, unfortunately, been short lived through extravagance and a variety of causes. From various explorations in the districts of the proposed line the writer has had opportunities of examining the several worked and undeveloped mineral grounds. To go minutely into the geological features would need a more able pen than that at the command of your correspondent. Moreover, the geological maps are about to be published. Beginning, therefore, at Mealsgate, and travelling towards the Caldbeck districts, noting a few striking and favourable features. Mealsgate, as many will be aware, is the centre of a branch line of the Maryport and Carlisle Railway Company, its two junctions being Aspatria and Waverton, near Wigton. At and surrounding Mealsgate we find the New Red Sandstone. Pits have been sunk, and coal found, whose winning, together with agriculture, is the chief means of industry in the neighbourhood. The coal formations are to be found extended south-westward, a little beyond Whitehaven in an easterly direction, a short distance above the village of Aughertree. Patches of sandstone may also be found near Uldale; indeed, coal is there to be seen, and was some years ago slightly wrought, though it is scarcely likely that any but a thin seam will be found. The coal measures "taking off" about this point, and being joined by the clay-slates, trap, &c., to the south, and the carboniferous limestone to the east, this formation extends for an unbroken series of miles, and is of the most free and open character, presenting the conditions of the West Cumberland district. The most striking expressions of iron ore are to be found about 1½ mile from the village of Treby, where the limestone is to be seen out-cropping over a great portion of the ground.

The most careless observer who possesses the slightest mineralogical knowledge cannot help being favourably impressed with the abundant signs this portion of the district exhibits of the above mineral. In the crevices of the limestone may be found lumps of ore from the size of a pea to that of a cannon-ball in the beds of the runners or streams. Springing from the cavernous openings may be found similar lumps of ore, intermingled with limestone and spary matter. The sedimentary deposits upon being carefully examined show minute portions of hematite of the best class. Several of the openings impress the beholder with the idea of being leaders to some considerable cavernous space. One in particular tends to this. The writer upon dropping a stone into it could distinctly hear the reboundings for several seconds; this with other favourable features leading him to think that where such free and open ground exists ore cannot fail to be found in bulk and at no great distance. The limestone upon some portions of the ground is of the best quality, containing as much as 97 per cent. of carbon. Other sections are greatly demonstrative of the precious mineral, but are not so characterised by the very striking features of the foregoing. Second in point of merit may be found near the village of Ruthwaite, the lord of the manor being Sir Henry Ralph Vane, Bart. In the opinion of the writer Sir Henry will, at a time not far distant, have applications from speculators to explore and work his royalties for iron and other ores. At Ruthwaite is a disused mine of sulphate of barytes that is or was recently worked by a London company, the promoters of which purchased the same for 600*l.* It is the candid impression of the writer that Sir Henry Vane will become the lessor of various mineral royalties whose yield will be by no means insignificant source of revenue. Should this be the case it will be a matter for rejoicing, as Sir Henry is universally respected for his kindly condescention and considerate nature.

The absence of a line is to be regretted as one advances in the direction of Fawld's Brow and observes the beauty of the building stone there found. If the proposed line becomes an actual one the Fawld's Brow stone will find its way throughout England to beautify our cities and reflect credit upon the Cumberland hills. Further advancing towards Caldbeck and Hesket Newmarket we find the porphyritic syenites and other primary rocks containing mineral wealth that should in itself alone have been ere now the means of a railway being constructed, and there is very little doubt that had many of the mines which are now standing idle been properly conducted such cartage as is now necessary would have been a thing of the past, but the necessary results of bad and unscrupulous management desires for machinery of elaborate construction to be erected where such might have been done without, staffs of men employed utterly beyond a necessary force have, together with a variety of circumstances, disgusted the lessees, and been the means of bringing about the now existing stagnation. Caldbeck, Hesket Newmarket, and their surrounding neighbourhoods have in a great measure been tampered with, to the discredit of their really existing mineral deposits, and it is to be regretted both for the sake of lessors and lessees that the systems that for years were practiced were allowed to be continued with a revival in trade generally. A railway in their midst, thorough and straightforward management, the minerals contained in the ranges of the above districts mentioned will be shown to be equal in pecuniary value to the more westerly divisions of the county, and the now existing lifelessness of employment in the neighbourhood spring

forth into vigour, and to be the means of Caldbeck's happy future. Some setts upon the lordship of Sir G. W. Denys, Bart., contain as far as five distinct lodes, others more, consisting of lead, copper, barytes, manganese, sulphur, ochres, &c., some of which have been worked until the shareholders became unable to continue operations; then abandoned, giving the public generally the impression the districts where comparatively barren in mineral productiveness. Many untried lodes yet remain that will with time show forth their mineral wealth, and be a means of bringing traffic to a line which, when constructed, will be a benefactor and be benefited; it is in some circles not considered presuming to credit the proposed railway as one that will be more cheaply constructed than any other Cumberland line, as the most favourable features mark the whole proposed route—the absence of any great railway engineering difficulties—great portions of common land—a wealthy and fast-increasing population—a country productive of every commodity to command a paying traffic. I trust my remarks may not be considered too lengthy.—*Whitehaven, Oct.* 25. W. W. B.

THE GREAT NORTHERN RAILWAY.

SIR,—With reference to my correspondence in the Journal of Oct. 19 and 26, the Railway and Canal Traffic Act, 17 and 18 Vict., cap. 31 sec. 2, states: "No railway or canal company shall give any undue preference or advantage to, or in favour of any particular description of traffic, in any respect whatever." The eminent secretary of the Central Commission of French Railways, in his 3rd vol., "Du Regime des Travaux Publeis en Angleterre," pp. 113, 114, gives a succinct rendering of the spirit of the Act: "Les tarifs doivent etre egalement perceus, d'apres le meme taux, que ce soit par toune, et par mille, ou outrement, et pour tout le monde, voyageurs, et marchandises!" At the maximum rate of 1d. per mile for a third or lowest class passenger, a ton at the usual computation of fifteen passengers is charged at the rate of 1s. 3d. per mile, whilst towards competing with seaborne coal traffic, in the face of their general manager's evidence, last April, that "such is impracticable," the Great Northern conveys coal to London at 0·38d., or less than ¾d. per ton per mile. Metropolitan tram conveyance, in spacious, velvet-upholstered cars, costs 0·33d. per passenger, or one third of the lowest class rail transit. The origin of the recent masons' strike, involving, it is said, an outlay of 30,000*l.*, was in a great measure due to cheap railway conveyance, and the united action of the Trades Unions, shipowners, and the public will be found to be more powerful than the phalanx of railway directors in both Houses of Parliament, to the extent of 52 in the Upper and 123 in the Lower House, by a recent computation. The late Sir Robert Peel stated in Parliament on March 11, 1842: "In the present state of this country it is a great object to facilitate the transfer of labour, and to enable those to whom labour is capital to bring it to the best market." M. de Franqueville, in his precited work, adduces the fact of the annual stipend of a general manager at over 100,000 frs. What does the Great Northern pay their present general manager ("de mortuis nihil nisi bonum"), who stated in my presence before a Parliamentary Committee, "he could not tell the apportionment to coal traffic out of the general working expenses?" Who is, morally, if not legally, bound to refund the 1871 terrific coal traffic loss? Who is responsible for the present coal traffic expenditure? Who will furnish the shareholders with an honest statement, or debit and credit account of the working expenses of coal traffic?

If the general manager cannot do it I am prepared with a party who can do it, without fee or remuneration. Who is responsible for the Nottinghamshire invasion? What means the general manager's evidence that the Great Northern had subscribed 20,000*l.* to the Sutton Bridge Dock, and the recent naive or arch significant rejoinder of the Great Northern Secretary—"But we have not yet paid it?" What are shareholders to think of the awful law expenses of the Great Northern, especially in their recent parliamentary campaign? What has been the cost of the Spalding and Lincoln Bill? Who is responsible for such—what shall I say—a myth? What is the annual loss on the Nottingham Canal, Fossdyke, and Witham navigation?

The Railway Clauses Act, 8 Vic., cap. 20, states, "any person may use the railway with engines and carriages on payment of equal tolls for passengers and goods, the rates to be posted at the stations and on posts every quarter of a mile." The fourth annual report of the Railway Commissioners, 1878, page 3, states, "It is a principal part of our duty to carry out upon demand the provisions of the Railway and Canal Traffic Act of 1854." Page 8: "We have power to deal with canal tolls as we may think fit if not equitably adjusted to the cost of railway carriage." The general manager and the secretary of the Great Northern refused to quote a rate for precited navigation for coal traffic to Boston, which is capable of displacing the entirety of their metropolitan coal traffic at a saving of 5s. per ton. Let these highly remunerated officials, as compared with the wages doled out to subordinates, submit to their directors the judgment of the Railway Commissioners of March 8, 1877, in No. 1 appendix to their report of Nov. 10, 1877, for their consideration, which in conjunction with the foregoing ought to convince them of the folly of such extravagant conduct. The Proceedings of the Institution of Mechanical Engineers, April, 1878, page 191, states, "The positive loss incurred by the transport of coal is a sum which it is almost frightful to contemplate." The rails on the up line of the Great Northern, over which the coal traffic for London passes, have been renewed five or six times, whilst the down line original rails have lasted many years. In my next I shall show the immense loss to landowners, the working and less favoured classes, and the public by the contravention of the Traffic Act by the Great Northern. WILLIAM JOSEPH THOMPSON.

6, *Fitzwillam road, Clapham, Oct.* 31.

MINING MANAGEMENT.

SIR,—In perusing the columns of your valuable Journal I see the metal market is still in a very depressed state, consequently the proprietors of mines must now use every economy to make them pay costs; and as the success of a mine in a great measure depends on having a thoroughly competent man to manage the same, more than ordinary care should be taken in the selection of one with the necessary qualifications, for there are a number of mines in Cornwall now a heap of ruins if which they had good management would be working to-day; others have succumbed. But by securing a superior administration before too late the best results have followed; to confirm this I will mention a case or two. The first is Wheal Peevor, which some years since under one superintendent would nothing near meet its cost, but when under another began to pay dividends, and proved to be a good mine. West Chiverton, too, was becoming a heavy burden to the adventurers in the shape of calls, when a change of management was decided on, and the services of Capt. Southey secured. Since then it has paid costs, and declared good dividends. I will next mention the Old Treburgett Silver and Lead Mine, which was stopped some nine months since. If report speaks true there was a screw loose there too, for it is said there is still plenty of mineral in the mine. The ore taken from there has fetched the extraordinary sum of 37*l.* per ton; that the halviner at work on the refuse or burrows made 22*l.* per ton of the last parcel sold. In fact, if a company would start it and secure the services of a thoroughly capable man to manage, I believe that it would very soon be in the Dividend List; for when the mine was on the point of being stopped the miners working there went to the manager and offered to work the mine on their own responsibility, but were refused. No other mines being in the neighbourhood, the poor fellows would have been in a sad plight indeed had it not been for the kindness of Mr. R. W. Roberts, who acted the gentleman he is, and gave them employment at once in the old Delabole Slate Quarries, he being the superintendent of the works there. We find that also in the history of these quarries a striking instance of what a trustworthy manager can do in comparison to an incompetent one. Some eight years since it was thought these works would have to be stopped, as they had not paid the cost of working for some time, and was also in a very dilapidated condition; fortunately the directors found where the mistake was before too late, and secured the services of Mr. R. W. Roberts. It is now one of the best investments in England, and also a blessing to the neighbourhood, as it gives employment to between 400 and 500 men. LOOK OUT.

St. Teath, Oct. 29.

MACHINE MINING—THE ECLIPSE DRILL.

SIR,—In addition to being awarded a Silver Medal at the Paris Exhibition, we have this morning received the following certificate, which we shall feel obliged by your publishing in next week's Journal:—

"*Paris, Oct.* 7.—The following work was done at the Universal Exhibition of 1878, in a piece of hard porphyry from the Voutré Quarries, Mayenne. The stone was of the following dimensions:—Length, about 19 in.; breadth, 13 in.; thickness, 11½ in. It was simply laid on the ground without being fixed in any way. It is evident that these conditions were very unfavourable for the drill. The stone was pierced through in 5½ minutes, the diameter of the hole being 1¼ in.——A second trial was made under the same conditions as above, in a piece of hard pyrites containing seams of carbonate of lime and galena, a very heterogeneous stone. The following were the dimensions:—Length, about 18 in.; breadth, 14 in.; thickness, 13 in. This stone was pierced through in 5 minutes, the diameter of the hole being as before. The drill used was the No. 6 Eclipse, with cylinder of 2½ inches in diameter.—A. BINARD, J. DUCHENOY, Engineers of the Mines and Chemical Product Company of Vedrin, Namur, Belgium"

We beg to add that the whole of the drills on show at the Exhibition were invited to compete at these trials, but all, with the exception of our Eclipse, failed to do so. HATHORN AND CO.

Charing Cross, Oct. 31.

THE CRANSTON ROCK-DRILL.

SIR,—The rate of progress made in the Eberhardt tunnel was—in April, 248 ft.; May, 173 ft.; June, 266 ft: total for three months, 687 ft. The slowest month was in May, 173 ft.; the best four weeks run was in the month of July this year, when 285 linear feet were driven. The total distance driven up to June 30 was 3536 ft.

Newcastle-upon Tyne, Oct. 31. J. G. CRANSTON.

ON UNDERGROUND HAULAGE.

SIR,—The old method of hauling underground by means of horses is now giving place, in mines of any importance, to that of hauling by machinery. Of the latter there are several systems adopted in the coal fields of Great Britain, as well as in those of the Continent. These systems may be enumerated as the main and tail rope, the endless rope, and the endless chain system. Besides these the locomotive principle is now in operation, in one at least of our coal mines; the engines on this system are actuated by compressed air, and they are likely to prove of considerable utility in deep mines in relieving manual labour, as well as for hauling on main roads.

Where the gradient into the workings of a mine is sufficient the single rope and drum system is the simplest mode of haulage, the empty wagons running down by gravity with the rope. The engine power is exerted by means of the rope in hauling the laden tubs up the incline. The inclination may be just sufficient to cause the wagons to run down with the rope by gravity, after overcoming the resistance of the friction in the wagons, and of the rope on the rollers, or it may be considerably more than this, requiring engine power in the ratio of the inclination to raise the load up the ascent. There may be branch roads on this system diverging to the right or left from the main road, provided there is an inclination sufficient in each to take the empty wagons into them.

The main and tail rope system requires at least two drums and two ropes. Some engines have four drums, whereby two engine-planes can be in operation at the same moment; the engine can pull the full wagons out on one plane while it is pulling the empty one inwards by the opposite tail drum. On the two-drum principle the main rope is of the length of the engine plane, while the tail rope is ordinarily twice the length, because this rope passes from the engine to a large sheave at the extremity of the plane, and back again to the siding at the pit, when it is ready to be applied in drawing the train of empty wagons inbye to the extremity of the plane, or to any of the branches, as arranged. It is not always requisite to use the tail rope to haul in from the pit. Where a steep gradient occurs from the pit inwards of considerable length it is usual to use the tail rope only from the foot of such gradient. When the full wagons are being hauled outbye, the tail rope being behind, on their arriving at the foot of the steep gradient the tail rope is knocked off without stopping the train, and for the remainder of the journey the main rope only is used. It will be seen the wagons run inwards by gravity only on this portion of the plane.

The hauling-engine with two drums for main and tail ropes, as constructed in the North of England, consists of two horizontal cylinders working to a crank shaft, a fly wheel on one side of the shaft, and a pinion on the other; the latter is geared to a spur wheel on each side, in the ratio of about 1 to 3. One spur wheel is on the main drum shaft, the other is on the tail drum shaft. Each drum has a clear space in front, and may be put in or out of gear by sliding carriages; the drum shafts are thus in length twice the breadth of the drum. This is preferable to having both drums on one shaft (when clutches are used), both for safety and in less liability to breakage. The main drum is usually of less diameter than the tail drum, varying according to gradient, as also do the relative sizes of the main and tail ropes. In many instances the engine is placed at the top of the pit, the ropes passing down the pits enclosed in boxes. An advantage is thus gained in having the machinery and boilers together, instead of taking steam in pipes to the bottom of the pit when the engine is placed there. The latter is the usual plan, and it should be placed so as to draw the wagons direct to the siding at the pit bottom.

The third system of haulage is by the endless rope, which is set in motion by an engine and clip pulley or a grooved wheel. The cost of a 4½-ft. clip pulley is about 40*l.* By means of these there is a considerable saving in ropes as compared with the tail rope system. In the latter the ropes are threefold the length of plane; with the clip pulley the length of rope is double. This system of haulage has been adopted extensively in the ironstone mines of Cleveland for hauling ironstone on varying gradients in trains of wagons. The clip pulley is also used for driving pumps. The rope is taken from the pulley at the engine, on sheaves, to the extremity of the mine, and there passes over another clip pulley. From the shaft of this the pump, of 6 in. diameter or more, double-acting, is worked direct, the altitude to which the water is raised being considerable in some cases. The engines are usually placed at the mouth of the slopes or levels.

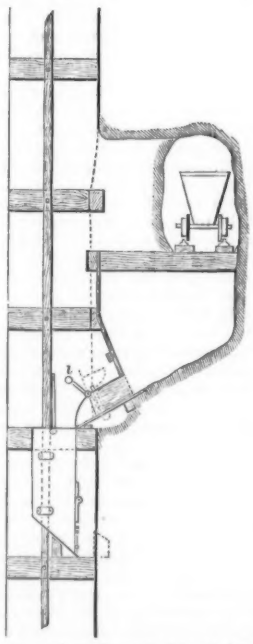
The fourth system is that of the endless chain. This method of hauling is gaining ground, having the merit of economy in its favour, as well as other advantages. An engine plane to be perfect should be straight with a slight dip towards the pit; it is rarely, however, that such a road can be constructed in a coal mine, the variation of dip, the occurrence of faults, and other causes operate against such a preconceived arrangement. Where there are turns and curves there will be additional friction thrown on the ropes and sheaves, and in a slight degree on the wagons. Where there are variations of gradients there will be consequent variations of power required in the engine, the attendant puts on steam or off as these changes of gradient occur; these changes entail additional friction on the ropes and wagons; these remarks apply to the rope system. With the endless chain system the chain is carried upon the wagons, the wagons run singly at the distance of 20 yards apart or more on two distinct lines of road, one for the empty inbye, the other for the full wagons outbye. There is thus no friction of the chain on rollers to be overcome. The speed of the chain is about three miles an hour. The loss from friction in colliery wagons may be on an average one in 50 of the weight; if the weight of a train be 50 cwts. the retardation from friction would be 1 cwt. The wagons in the endless chain system may be so balanced going in and coming out that scarcely any engine power is required for hauling them. On a road with an outward inclination of one in 30 the gravity of the laden wagons is sufficient to overcome the gravity of the empty ones, besides the whole friction of the wagon wheels. This is a case which will not often occur in practice, but where there is a considerable dip of strata there is evidently a field for so arranging the roads that the gravity on steep roads may operate in overcoming the friction and resistances on level or ascending roads, and give the required speed to the chain. As the full wagons reach the pit one by one the supply of coal to it to be raised by the winding engine to the surface is nearly uniform. There is no over supply of wagons at one time, as with a train, or a lack at another. The engine power required is also nearly uniform by reason of the continual motion of the chain, the feed of wagons to the chain being continuous at both ends; those from the workings as quickly as the coal can be extracted and filled, and those from the pit as quickly as they can be raised and sent down again. It may also be observed that the endless chain is applicable to roads having curves and turnings in it; if this can be done without the intervention of guiding sheaves, and only by its resting on the top of the wagons, it must be admitted that the system will compare favourably with others in economy of working, and in less expenditure of power on friction.

These remarks indicate generally the application of the different systems to underground haulage; other examples, and the locomotive principle of hauling, the writer proposes to give at a future time. M. E.

ECONOMY IN FILLING SKIPS.

SIR,—It has been found necessary in the working economy of deep mines to have as few shafts as possible, in order to save the large amount of money that it takes to open new ones and supply them with the requisite fittings. Hence we often find in mines of from 400 to 500 fms. long on course of lode, and from 200 to 400 fms. deep, it is deemed advisable to wind all the stuff, as well as to pump all the water, from one central and well fitted shaft. This shaft, in order to meet the requirements of a nicely opened mine, has to be provided with plats or stations, one at every 10 or 15 fms., to serve as depositories for the mineral, &c., that is broken at the corresponding depths. Thus, in a mine of the above-mentioned depth we should have from 20 to 40 of these plats, but it is probable that the upper half would have become disused, owing to that portion of the mine being worked out before such a great depth had been reached, but still there would be the lower half, consisting of from 10 to 20 of these plats, from which large and varying quantities of mineral debris would have to be hauled. Thus we see that the space set apart for the whim-shaft would have to be made the most of, in order to keep clear so many plats. And although kibbles have been considered inefficient to raise such large quantities for several reasons—1. On account of their necessarily being egg-shaped (to prevent as much as possible their hitching in ascending and descending without guides) they hold but a small amount of stuff compared with the room they take up in a rectangular shaft. —2. Their liability to twirl round diminishes the strength of a round rope, which is weight for weight much stronger than a flat rope or chain, and therefore makes it necessary to use flat ropes, chains, or much larger round ropes than would otherwise be required.—And 3. The constant oscillating movement of the kibble in the shaft renders it impossible to wind as fast as can be done with safety where guides are used; beside the tremendous amount of wear and tear occasioned to the shaft, dividing, kibbles, chains, &c., to say nothing of the frequent catching of the kibble so as to break the chain, resulting in a great amount of damage being done to the shaft dividing, sometimes almost clearing it away from top to bottom, and hurling it in a confused mass into the sump. We likewise see whilst considering the great number of levels from which we have to haul, and which have to be constantly kept clear of stuff to allow of the ends, winzes, rises, and stopes to be worked to the best advantage, that we cannot imitate with economy the system adopted in our coal mines—that of tubs and cages—owing to the large amount of dead ground we should have to take away in constructing of double tramways, or the large amount of delay that would be otherwise occasioned, not mentioning the price of such a large rolling stock as would be required for a large mine.

So we come to the conclusion that the system of skips and skip-roads as adopted in Cornwall is the best for mining our metalliferous veins; the only failing or disadvantage being, so far as I can see, that of filling the skips by shovelling, as is generally done by one or two men, for we frequently find that after the lander has emptied the skip five or six minutes more elapses before the whim receives the token from the fillers to "wind up." In examining this affair we will assume that the journey from plat to brace occupies four minutes, the landing of the ship one minute, whilst the time taken up in filling, inclusive of the one minute in landing, is six minutes: total, 10 minutes, or six skips an hour. Thus if we had a means whereby we could fill the skip below as quick as it is emptied above, we should save five-tenths of the whole time, effecting an economy of half the number of days' wages paid to the engine-driver, lander, and skip fillers, or otherwise enabling them to perform twice as much work for their money. This question has occupied my attention for some time, and I have conceived a plan whereby this economy may be made. My plan, though simple, provides the means whereby the skips are filled by specific gravity, as shown in side view in the following diagram:—



The tip plat is cut with a funnel-shaped bottom, and a stout wooden dividing separates it from the shaft; a conducting shoot is fixed at the bottom of the dividing, having a point hinged to it, and provided with a balance lever (*l*) to admit of its being turned up to the position shown by the dotted lines for the skip to pass up or down. The balance lever helps to keep the point of the shoot steady whilst down for filling the skip, and likewise sustains it in position when turned up.

This form of shoot provides against any damage being done, should it be found necessary at surface to take away the skip unknown to the filler, or in time of mistake through accident, for it will be seen that the skip in being drawn up lifts the movable point of the conducting shoot, and with the aid of the balance lever places it into the posit on required for the skip to pass without any damage being done. For convenience of dispatch the stopper of the shoot is near the hinge, so permitting the filler to maintain it full of stuff, in

order to fill the skip quicker on its arrival, should there be any difficulty in getting the stuff to run quickly enough. Sometimes the shoots that are put in under the stulls or at the mouths of winzes get choked by a large stone, but here in the plats this could easily be guarded against, as all the stuff has to be handled over by the trammer before being brought to the plat.

Bailen, Oct. 23. HENRY BREWER.

THE PROTECTOR LAMP AND LIGHTING CO. (LIMITED).

SIR,—In reading the list of awards in last week's Journal I find that you have omitted to notice that the Protector Lamp and Lighting Company (Limited) were awarded a bronze medal for safety-lamps—the highest award granted for safety-lamps They also received the highest award given for miners' safety-lamps at the Brussels Exhibition of 1876. W. E. TEALE.

Manchester, Oct. 30.

GREAT LAXEY MINING COMPANY.

SIR,—I presume that the object of an account being furnished by directors to shareholders is to show the amount of profit or loss for the period embraced in it. If this be so, why do the Great Laxey directors issue their half-yearly statement in the present form? I challenge the chairman, or even the most experinced accountant in England, to tell from the last account (taken by itself) the amount of profit for the half-year. From the figures it would appear that the balance was only diminished from 4974*l.* to 4328*l.*, while dividends had been paid amounting to 12,000*l.* Anyone, therefore, would suppose that 12,000*l.*, less the diminution of the balance, 646*l.*, was the half-year's profit; but if we refer to the previous account we find that the stock of ore, valued in February at 12,596*l.*, had been reduced to 7591*l.* in August. This difference, then, 5005*l.*, has to be deducted, leaving the actual profit for the half-year ending August 6349*l.* only. If the mine only earned 6349*l.* in six months, why did the directors divide 12,000*l.*? And why, in the face of a falling lead market, which will probably seriously affect the current half-year's profits, has a dividend of 4500*l.* for the quarter been declared? Why, indeed, do they give a dividend at all, when the accounts show liabilities for royalty, merchants' bills, &c., amounting to 8985*l.*, while the assets, exclusive of reserve fund, were only 7393*l.*? True, they had 400 tons of lead ore, valued at 5400*l.*, but on the other hand there would be two months' expenses—nearly 8000*l.*—to be paid before the dividend was declared. The steamship account shows a balance due to bankers of 1433*l.*; why is money borrowed from the bank on this account while there is a sum of 2876*l.* due from the mining company? There is no reason why the steamship account, with a balance of 911*l.* to credit of profit and loss, a sum amply sufficient for working capital, should ever be indebted to its bankers. If the mining company cannot afford to pay ready money to its creditors, surely dividends should be suspended until matters are altered.

The Chairman seems to look upon the reserve fund mainly as a machine for equalising dividends. Surely a limited mine like Great Laxey, with no uncalled capital, should treat it as a reserve to supply the want of capital in case of emergencies, for which purpose it should be increased by a percentage upon the amount of dividends declared, and not by mere arbitrary amounts occasionally. Who can say that 5228*l.* is a sufficient reserve fund for a mine whose expenditure reaches 4000*l.* per month? Probably these questions might have been asked at the meeting, had not the attendance of many shareholders been prevented by the tempestuous weather.

Oct. 28. A SHAREHOLDER.

MINING IN WALES.

SIR,—Your North Wales Correspondent, in last Saturday's Journal, gives us a very fair specimen of what has lately been a common occurrence in the Principality, and he exposes a pernicious system which would never have flourished to the extent it has but for a species of mania on the part of the public. Your correspondent informs us that the Great West Van Mine—seven miles from the productive mine from which it takes its third title—was sold some years ago to a company for 26,000*l.*, and the week before last it was purchased by the original vendor for 2050*l.*, and your Correspondent remarks that as soon as a new discovery in any district takes place the mine will, doubtless, be again started under a new name with its riches vividly described. I have been largely associated with mining in Wales, and am well aware that this system has been most extensively pursued there.

There have been, and are still, many sound mineral properties in the principality, and worked in a legitimate manner, with a view to their development, but in the past few years a vast number of worthless concerns have been palmed off upon the public at premiums which no sane person would think of giving even for properties of a *bona fide* and hopeful character. What renders the fact of these enormous premiums the more extraordinary is that the mines were never intended to be worked with a view to development, but they were started simply to supply an insane desire on the part of the public to rush into any speculation having a Welsh locality, and to put money into the pockets of a few knowing ones who knew how to foster the prevailing mania, and to profit by it. When the small amount of capital set apart for working one of these schemes is expended, when the share market can no longer be manipulated and kept in an active state, it is astonishing what little concern promoters show for the progress and welfare of the scheme they loudly extolled at their introduction, and how quickly those schemes go into liquidation.

Excluding many companies which, like Great West Van, have gone into liquidation, and for which many thousands of pounds were paid. The Share List of the *Mining Journal* gives 60 non-dividend mines in Wales and Shropshire upon which capital has been paid to the amount of 1,673,227*l.*, or an average of 27,887*l.* per mine. If to this were added the capital paid upon the mines which have disappeared from the Share List, I doubt not, from my knowledge of many of them, that the total would represent upwards of 2,000,000*l.* which have been paid for Welsh mining schemes since the success of the Van Mine. Of this vast amount it may safely be said that three-fourths have gone into the pockets of clever vendors, promoters, and financiers.

East Van Mine, with 90,000*l.* paid capital, has never sold a pound of mineral, and yet so fascinated were the public by anything that bore the name of Van that the mine once had a market value of over 200,000*l.* A large majority of these Welsh schemes were old abandoned properties with no feature whatever of success. How many of them will return even the very small amount of the capital which has been spent in explorations requires no great amount of judgment to predict.

The late serious drop in lead has for the time stamped out the pernicious system your Correspondent exposes, and the occupation of the promoter and financier is gone, but the result of what has been will I fear be a severe blow to mining industry in Wales, and the consequences of which every advocate and supporter of legitimate enterprise must deplore. Cornish mining, too, just now is under a cloud, owing much to the low price of tin and copper, and not a little to the recent exposures of the reprehensible system of allowing debts to accumulate unknown to the adventurers. Still I think the position of our chief Cornish mines shows more satisfactory features than the bulk of the Welsh adventures. The way in which some of our mines here have regulated their finances is deserving of the severest censure, and no one can be surprised at the want of confidence in Cornish mining which it has brought about. But let us not forget that the money did not go into the pockets of vendors, promoters, and financiers; it is still in and on the mines in the shape of machinery, materials, shafts sunk, and levels opened, and as the mines still possess undoubted elements of future success, with a fair price for their produce when that time comes, as come it will, the mines will speedily regain their former profitable position, and let us hope and trust with a management grown wiser and more prudent from the errors of the past. But this can never be the case with the Welsh concerns I have alluded to. The bulk of their capital has not been spent in developing the properties, but has foolishly been paid to a host of shrewd promoters, &c., for nothing more than a privilege on the part of the public of putting their money into resuscitated mines which former workers had proved to be worthless, and many of which mines had more than once before been re-christened and re-opened to satisfy a public demand created by some discovery in a distant district.

Truro, Oct. 29. ONE WHO HAS BEEN IN WALES.

WHAT IS ELVAN?

SIR,—If "Subscriber" is the same person who asked me the above question in Douglas the other day it would be better for him to obtain a specimen of "the rock the miner describes as trap," and show it to someone experienced in such matters, who could, perhaps, inform him what it is exactly. W. H. ROWE.

Isle of Man, Oct. 29.

WHAT IS ELVAN?

SIR,—The late W. Jory Henwood, F.R.S., F.G.S., &c., wrote as follows:—"Elvan is, for the most part, disposed in veins or (courses) dykes, which sometimes measure a few feet only, but are commonly several fathoms in width. Elvan courses traverse granite as well as slate without interruption. Whilst in slate they generally consist of compact felspar and quartz, mixed at times with schorl, and—perhaps less frequently—with mica, enclose buff, pink, or dove-coloured crystals of felspar and double-pointed crystals of quartz, which sometimes seem to have suffered attrition. During their course through the granite felspar and quartz still prevail, and mica and schorl abound, and embedded crystals are still numerous, but the basis is mostly of finer grain than in the slate. In both rocks, however, the elvan is usually coarser and more porphyritic towards the middle than at the sides."—*Ballydehob, Oct.* 30.

PARK MINES, MINERA, DENBIGHSHIRE.

SIR,—I am glad to notice a report of operations at the above mines in the Journal of Saturday last, and to find that there is a growing disposition to admit the public into properties which have been so long monopolised by private companies realising untold wealth, for I am sure that if capitalists had only a share of the immense profits derived from some of the Flintshire and Denbighshire mines during the last 50 years no difficulty would be experienced in financing any legitimate project, even in these dull times. Appearances at the above mines denote a prosperous future—indeed, it would be strange if it were not so, judging by former results westward upon the main lodes in this property, and by the great successes in the side mines of Minera and Pool Park.

Rhosddu, Oct. 31. MINING ENGINEER.

WHEAL PRUSSIA.

SIR,—In reply to your correspondent in last Saturday's Journal, enquiring in what way certain mines have diminished their capital, I beg to inform him that with regard to this mine the amount at first agreed on to be subscribed was found not to be required, consequently the first instalment of only 5s. per share has been demanded, the remainder having been remitted to the shareholders. The mine has paid for its own development, a steam-engine, and other machinery, and can be made to pay dividends whenever considered desirable to do so. Every point of operation is looking well, and being in virgin ground starting on lodes that are productive near the surface has all the great advantages such a position indicates.—*Redruth, Oct.* 31. THE PURSER.

WHEAL AGAR—THE MANAGEMENT.

SIR,—By the circular just forwarded to me I find that at the last meeting a call of 10s. per share was made. This I do not object to, as I consider that the prospects of the mine and the economic system of management hitherto pursued fully justify all legimitate outlay. But what I do not approve of is that a resolution should have been passed granting a remuneration of 3*l.* 3s. per month to the committee of management for their services. Had matters been reversed—a dividend paid instead of a call made—I should have been one of the first to have agreed to paying the money; but when we are called upon to meet calls for what may be considered purely legitimate purposes I think it savours of something like questionable taste—to make a double call, for the mine and for the committee. Perhaps those gentlemen may be induced to reconsider their conduct. and allow their remuneration to remain over until the shareholders get some return for the outlay at present made.

City, Oct. 29. SHAREHOLDER.

THE LAMORNA GRANITE WORKS.

Although granite quarrying has hitherto remained almost exclusively in private hands, it is believed to be very profitable, and special qualities, such as the Lamorna, can always command a good price from the way in which it is sought by purchasers. Taking advantage of this fact a company has been formed—The Lamorna Harbour and Granite Works—with a capital of 25,000*l.*, in shares of 10*l.* each, to purchase the property hitherto held by Mr. W. H. Owen, and which is in going order, and ready to made immediate profits. The Harbour property is situated at Lamorna Cove, about four miles from Penzance, and comprises about 20 acres of leasehold land, together with so much of the foreshore as is sufficient for the pier, which forms the breakwater and harbour. The harbour is formed by a wharf 194 ft. long, and a pier or jetty 129 ft. in length. It is on this land that the granite quarry has been opened and worked, and is now clear and in working order. The quarry crane is of ample size, and there is a powerful shipping crane on the pier, whilst for what may be regarded as manufacturing purposes there is a good travelling crane for stacking and moving stone, and all necessary substantial stone-built buildings—blacksmiths' shop, forges, powder magazine. The wharves and pier are well and substantially built in ground blue lias mortar, solid throughout, and every stone of the pier within range of the sea was laid in hot hydraulic mortar, and cemented with Roman or Medina cement, so as to form one solid mass from surface to centre equal to an original solid rock. In addition to this there is a stone-built carpenters' shop, lime and mill house, with a good mill, drivenby a 12-horse overshot water-wheel. In fact, there appears to be everything necessary for carrying on a good business.

With regard to the position and prospects of the granite trade, it is stated that notwithstanding all that has been done of late in connection with the introduction of asphalte and wood as rivals to granite pavement the trade during the last ten years has been profitable and increasing, and during the last five years the demand for granite has increased to such an extent that at the present time it seems as if one-twentieth of the demand will not for many years be adequately met. The essential requisites for a good street pavement are that it shall be smooth and hard in order to promote easy draft; that it shall give a firm and secure foothold for animals, and not become polished and slippery from use, that it shall be as free from mud and dust as possible, and that it shall be easily cleansed, and shall not absorb and retain the surface liquids, but facilitate their prompt discharge into the side-gutters and catch-basins. It should also be of such material and construction that it can be readily taken up in places and quickly and firmly relaid, affording immediate access to water and gas pipes. Economy of maintenance and repair necessarily demands that the material at the surface shall be durable. There might seem, it is said, to be less tractive forces required both on wood and asphalte; as, however, there is not so good a foothold or grip on a smooth surface, such has asphalte or any other hard and smooth surface, it is doubted if any advantage is gained in this respect over a good granite pavement, while no one will now doubt the advantages of granite pavement in all of the other qualities.

Some new granite pavement recently laid in Liverpool is reported to be the finest in the kingdom, and even a report furnished by the borough engineer of Bradford, in Yorkshire, to the Town Council, shows that granite paving is preferable to Yorkshire, both in regard to economy and tractive force, and especially in a sanitary point of view, also as to foothold for horses. The subject of asphalte or wood pavement seems not to be of sufficient importance to be thought worthy of consideration, at least no comparison is made. According, however, to the report of Mr. George M. Van Nort, Commissioner of Works of the City of New York, that city seems not only to have given wood pavement a thorough trial but to have paid dearly for the experience. He states in a report in February, 1873, respecting the relative slipperiness, "I have to say it compares unfavourably with stone pavement, and is about equal to concrete pavements. In addition to the above, I would say that wood pavements are especially objectionable where the drainage is insufficient, or the ground naturally damp," and that his experience is that in thoroughfares subject to heavy traffic the best of wooden pavements are almost useless. He further states, "Assuming that no more wooden pavement will be laid in this city, it is estimated that at least 80,000 yards of renewal will be required in each year to maintain the present quantity, and if that is done with patent material at the present price of $4 per yard, it will entail an annual expense of $320,030 for 18 and 3-10ths miles of streets, or an average of $17,486 per mile per year, while the repairs of stone pavements in 290 miles of streets have cost but $150,000, or an average of $517 per mile per year." He further states that since decay has taken place in wooden pavement very many complaints have been made of the offensive effluvia emitted from it, and also of its being unfit to travel over.

Returning to the Lamorna Works, it appears that the granite produced there would not even have to seek so low-priced a market as that for paving sets, as it is readily saleable for architectural and engineering purposes, the dressed ashlar fetching 4s. 6d. per cubic foot; the scappled 1s. 11d.; and the small 1s. 9d. per cubic foot; and no doubt exists as to its quality, inasmuch as it has already been used for lighthouse building in the present Longships Lighthouse. Even other quarries less favourably situated than the Lamorna, and having to ship at Penzance, have made large profits, and the stone from the neighbourhood has been extensively used in the new Government docks and other works. The property has been carefully inspected and reported upon by Mr. R. B. Grantham, C.E., F.G.S., whose report is appended to the prospectus, published in another column of to-day's Journal, and is of a decidedly favourable character; whilst a carefully prepared estimate of receipts and expenditure shows that dividends at the rate of 12 per cent. per annum on the entire 25,000*l.* could be paid, after liberally providing for all management charges, and carrying about 20 per cent. on dividends to a reserve fund.

THE SCOTCH MINING SHARE MARKET—WEEKLY REPORT AND LIST OF PRICES.

During the past week business has continued very quiet. The usual fortnightly settlement has intervened, and particulars of the business then done are given below. The new account for settlement Nov. 14 has opened rather unpromising. What with the political complications becoming more grave in Afghanistan and Turkey, and the commercial depression increasing, investors are little inclined to buy, and only when prices are freely reduced. The only favourable feature is the better feeling in the money market, and according as this proves justified or the reverse should confidence generally be ruled. There is no immediate revival of trade in view, but the quarter it must come from is becoming clearer—increased demand, because the cost of production, both as regards wages and prices of materials, is now being brought down in no uncertain way to meet the views of consumers. At the same time the weaker producers are gradually being dropt out of trade, and soon all obstacles to a good revival in trade will surely have disappeared.

In shares of coal and iron companies, Shotts have fallen this week 9*l.* per share, Bolckow, Vaughan, A, 1*l.* 15s., Lochore and Capledrae, also Monkland (pref.) each 1*l.*, Monkland 15s., Cairntable and Chillington each 5s., and Glasgow Port Washington, 1s. 3d. On the other hand, Benhar and Scottish Australian have both recovered about 1s. 3d. The principal dealings have been in Benhars, which have fluctuated between 45s. and 64s. per share. The meeting of the Glasgow Port Washington is to be on Nov. 7. Andrew Knowles and Sons (20*l.* paid) are at 6½ dis.; ditto (25*l.* paid), 8 dis.; and ditto (50*l.* paid), 41. Bolckow, Vaughan (A), 53 to 53½; ditto (B), 34¾; and ditto (stock), 110. Brown, Bayley, and Dixon, 6¾ dis. Cardiff and Swansea, 25s. Charles Cammell and Co., 11½ dis.; ditto, 6 per cent. (debentures), 101½; and ditto 5 per cent. (debentures), 100¼. Chatterly, 38 dis. Chillington, 55s. to 60s. Ebbw Vale, 5¼ to 6½. Great Western, 40s.; ditto (pref.), 9os.; and ditto (debentures), 62. John Bagnall and Sons, 17s. 6d. John Brown and Co., 14½ dis. Muntz's Metal, 65s. prem. Newport, Abercarn, 90s. Pelsall, 11¼ dis. Rhymney, 14½. Sandwell Park, 16½. Scottish Australian, 30s. to 35s. Sheepbridge, 29 dis. South Wales, 70s. Staveley (A), 90s. prem.; ditto, B, 30s. prem.; and ditto, D, 12¼. Tredegar, A, 10½. West Mostyn (pref.), 20s.

In shares of foreign copper companies there has not been much doing, and the only alteration is a fall of 15s. on Rio Tinto shares. Tharsis are now quoted ex div., and have not varied more than from 20¾ to 21½ all the week. The shipments of copper by the English and Australian Company have been about 60 tons according to last advices. Rio Tinto 5 per cent. are at 57; Yorke Peninsula, 2s. 6d. to 3s. 9d.; and ditto (pref.), 12s. 6d. to 17s. 6d.

In shares of home mines there has been slightly more doing, but at lower rates. Tin shares are exceptionally good, the demand, however, being confined to such shares as South Condurrow, South Frances, Dolcoath, Carn Brea, and Tincroft. The Wheal Crebor meeting is to be held to day, when a small call is expected. Glasgow Caradon shares are unaltered. Leadhills more offered, the report being disappointing, Bampfylde are at 5s.; Bedford United, 5s.; Bodidris, 20s. Cambrian done at 33s. 3d.; Combmartin, 5s.; Cook's Kitchen, 17s. 6d.; Devon Consols, 15s. to 25s.; Deep Level, 57s. 6d.; East Caradon, 10s.; East Lovell, 25s.; East Pool, 9; Gawton Copper, 10s.; Great Laxey, 15 to 15½; Gunnislake (Clitters), 17s. 6d.; Herodsfoot, 60s.; Hingston, 7s. 6d.; Marke Valley, 15s.; Merlyn Moor, 10s.; Mellanear, 80s.; North Laxey, 1s. 6d.; Plynlimmon, 2s.; Pandora, 15s.; Phœnix, 25s.; Roman Gravels, 3¾ to 6¼; South Crofty, 25s.; South Caradon, 57½; St. Patrick, 9s. 9d.; South Roman Gravels, 2s. 6d.; West Tolgus, 41½; West Basset, 20s.; West Chiverton, 20s.; West Tankerville, 1s 9d.; West Frances, 45s.; Wheal Crebor, 8s. 9d.; Wheal Kitty, 17s.; Wheal Peevor, 6½; Wheal Uny, 17s. 6d.

Shares of gold and silver mines are generally steady. Richmonds, after being at 9½, have advanced to 9⅞, 10. Santa Barbara shares are better since the last report, and the demand has extended to Pitanqui. It should be understood that the new Exchequer shares, which are being issued at 2s. prem., are entitled to dividends the same as the original shares, and in addition to coupons, which will either repay the entire amount subscribed, the shares then being held free of cost; or in the case of the last undrawn coupon, the shareholder having only paid 1*l.*, will hold a 1*l.* share, and receive 10,000*l.* Consols. A notice was issued some time since that a meeting would be called to declare a dividend, but no date was named. The accounts for August of Tolima show an estimated gross profit of 1899*l.*; Frontino and Bolivia a profit of 286*l.*; Antioquia a loss of 49*l.*; and St. John del Rey, in September a profit of 4700*l.* Birdseye Creek are at 14s. 6d. Cedar Creek, 2s. 6d.; Colorado United, 45s; Eberhardt, 73s. 9d.; Emma, 2s.; Flagstaff, 7s 6d. to 10s.; I. X. L., 2s. 6d. to 5s.; Javali, 5s. to 7s.; South Aurora, 2s. 6d. to 5s.; Tecoma, 2s. to 4s.; United Mexican, 70s.

In shares of oil companies Uphall are reduced 10s., and Young's Paraffin, 6s. 3d. Young's Paraffin have been firm between 13 to 13¾. Runcorn Soap and Alkali are at 6¾ dis.

In shares of miscellaneous companies business is quiet. Phospho-guano shares are 10s. lower, at 8 to 9. Hopkins, Gilkes, and Co., 10½ dis. In wagon companies shares, Scottish Company's shares are 2s. 6d. lower on the old issue, and 1s. 6d. on the new. The meeting of the Birmingham Company is to be held to-morrow. At the annual meeting of the Gloucester Wagon Company the report presented was rejected. After a new board of directors had been elected a revised report was adopted. Owing to an unfounded alarm among the debenture holders the directors did not declare any dividend, but the Chairman said their securities were as good as 4*l.* against every 1*l.* of liabilities. Birmingham 6 per cent. (pref.) are at 12; Bristol and South Wales, 8; Gloucester, 9¼; Metropolitan, 40s. prem.; Midland, 13¾; Railway Carriage, 90s.; Sheffield, 2s. 6d. prem.; Swansea, 30s.; and Union Rolling Stock (pref.), 5s. prem. In chemical companies prices are—Lawes', 8¾; ditto, 7 per cent. (pref.), 10; Langdale, 87s. 6d.; Newcastle, 4¾. 9d.

MUNDIC MINES.—All mines this kind are now stopped, as the expenses of raising, &c., were so great they could not compete with Spanish ores; of course, mines raising other metals have often more or less mundic, but the percentage of sulphur is too small to make its treatment profitable. At the few small acid works where it is still used, it is likely ere long to be supplanted by the Spanish. It is considered unprofitable to use any under 33 per cent., and a Cornish mine raising some from 38 to 42 per cent. has long been stopped as unprofitable, so it is evident that this trade has fallen completely into the hands of the Spanish producers, among which the Tharsis Sulphur and Copper Company occupies the first place.

RAILWAY CARRIAGE COMPANY (Limited).—This company made a profit last year of 757*l.* The reserve fund was drawn upon to pay the usual dividend on the preference shares, and 5 per cent. on the ordinary. The depression in their business had increased, and several alterations were effected in the staff, with a view to economise. To these alterations is attributed the more favourable result effected on a decreased turn over. If any revival in trade takes place, the directors report their works are in a capital condition to execute orders well, speedily, and economically.

On Contango-day the following were the rates of continuation current:—Contangoes: 6d., 7½d. on Benhar Coal, 1½d. on Glasgow Caradon, 1½d. on Monkland, 1s. 6d. on Richmond, 6d., 9d., even on Tharsis, 6d. on Uphall Oil, 3d. even Young's Paraffin.—Backwardations: 7½ even on Uphall Oil, 3d. on Young's Paraffin. On comparing the making-up prices of the undermentioned shares fixed to-day with those of the previous settlement the following variations are shown to have taken place during the account:—Benhars have fallen 1*l.* 15s. per share, Uphall Oil 1*l.*, Marbella 17s. 6d., Young's Paraffin 15s., Tharsis 12s. 6d., Monkland 7s. 6d., Huntington 6s., Glasgow Port-Washington and Richmond both 3s. 9d. Glasgow Caradon, Oakbank Oil, Omoa and Cleland, also Tharsis (new), are all unaltered.

CAMBRIAN MINING COMPANY (Limited).—The shares of this company have come into notice again through circulars being issued announcing the discovery of a lead lode 4 ft. wide, and yielding at least 2 tons per yard. It is also stated that they have a lode of very rich copper nearly 2 ft. wide, and producing 3 tons per yard. What consideration, if any, should be given to these reports is for those interested to decide. A fair lot of the shares was unsuccessfully offered at 35s., yet many circulars here

been received in this district advising a purchase of them at 3*l*. While no one could be desirous of deterring mining enterprise, yet when anything does go wrong the law of redress in England is so defective, compared to that in Scotland, that it is for the interest of all to point out anomalies of this kind.

CANADIAN COPPER AND SULPHUR COMPANY (Limited).—At the annual meeting of this company, on Tuesday, the directors' report and balance-sheet were adopted. The Chairman stated that a cablegram was received about a week since reporting a find of fair copper, but, pending the arrival of details by the mail, he is far from sanguine about it. Unless the information is more encouraging they will stop spending any more money, and a meeting will be called as soon as possible for liquidation. It is as well to understand that the concern is not bankrupt, as it is entirely free from debt, and possesses a fair cash surplus.

MINING IN FLINTSHIRE.—The Halkyn Drainage Company is issuing 1500 more shares to present shareholders *pro rata*, and allotments are being offered at a small premium. At the last meeting it was decided to subscribe this 15,000*l*., and a round-robin is being signed for the purpose, headed by the Duke of Westminster. They will then have sufficient funds to carry the tunnel to South Pant-y-Go shaft in the Rhosesmor sett. The rate of progress last week was again 18½ yards, equal to 74 yards a month. Rhyd Alun Mine is still improving, and they have a nice parcel of ore ready for the next Holywell Ticketing. Victor shares are at 35s., and the mine has considerably improved. A good course of ore has been discovered on the Coed Du vein, and it is expected this mine will be a large producer of lead next year. Prince Patrick shares are changing hands at a considerable advance, the ordinary having touched 35s., and the preference 57s. 6d. The latter are scarce and some think will reach 5*l*. The new discovery at this mine is improving daily, and it is not too much to say that they have now one of the richest veins of lead in Wales. At present the drivage yields 10 tons of rich lead per fathom. It requires no washing, 75 per cent. of the whole being pure lumps of galena.

Capital. Per share.	Paid up.	Dividends. Rate per cent. per annum. Previous.	Last.	Description of shares.	Last price.
£10	£8	£7	£7†	COAL, IRON, STEEL. Arnlston Coal (Limited)	7⅛
10	10	4	4	Benhar Coal (Limited)	54s.
100	50	22s6d‖	34s6d‖	Bolckow, Vaughan, and Co. (Lim.) A.	53½
10	10	10	10	Cairntable Gas Coal (Limited)	8
10	10	4s‖ April, 1876		Chillington Iron (Limited)	60s.
10	7	—	—	Clyde Coal (Limited)	7
23	20	10s‖ Dec., 1874		Ebbw Vale Steel, Iron, and Coal (Lim.)	6
10	6	nil	nil	Fife Coal (Limited)	70s.
10	10	nil	nil	Glasgow Port Washington Iron & Coal (L)	36s. 3d.
10	10	—	—	Ditto Prepaid	40s.
10	10	—	—	Lochore and Capledrae (Limited)	60s.
10	10	nil	3	Marbella Iron Ore (Limited)	37s. 6d.
10	10	nil	nil	Monkland Iron and Coal (Limited)	30s.
10	10	5	4	Ditto Guaranteed Preference	40s.
100	100	nil	nil	Nant-y-Glo & Blaina Ironworks pref. (L)	20
6	6	nil	nil	Omoa and Cleland Iron & Coal (L. & Red.)	7s. 6d.
1	1	15	15	Scottish Australian Mining (Limited)	35s.
1	10s.	15	15	Ditto New	15s.
Stock	100	nil	nil	Shotts Iron	80
				COPPER, SULPHUR, TIN.	
4	4	—	—	Canadian Copper and Sulphur (Lim.)	5s.
10	7	77s 6d‖	35s‖*	Cape Copper (Limited)	29
1	1	7½	2½	Glasgow Caradon Copper Mining (Lim.)	20s.
1	15s.	7½	2½	Ditto New	13s. 6d.
10	9¾	nil	nil	Huntington Copper and Sulphur (Lim.)	10s.
4	4	—	—	Panulcillo Copper (Limited)	20s.
10	10	6†	6†	Rio Tinto (Limited)	50s.
20	20	7	7	Ditto, 7 per cent. Mortgage Bonds	14/ 3s 9d
100	100	5	5	Do.. 5 p.ct. Mor. Deb. (Sp. Con. Bds.)	61
10	10	22½	20	Tharsis Copper and Sulphur (Limited)	20¼
10	7	22½	20	Ditto New	13⅜
1	1	—	—	Yorke Peninsula Mining (Limited)	5s.
1	1	—	—	Ditto, 15 per cent. Guaranteed Pref.	17s. 6d.
				GOLD, SILVER.	
1	1	—	—	Australian Mines Investment (Limited).	8s.
5	5	7s. 6d‖	7s. 6d‖	Richmond Mining (Limited)	9¾
				OIL.	
10	7	6	15	Dalmeny Oil (Limited)	8¼
1	1	7½	25	Oakbank Oil (Limited)	40s.
1	5s.	—	25	Ditto	11s.
10	10	7½	2	Uphall Mineral Oil (Limited) "A"	5¼
10	10	—	—	Ditto "B" Deferred	10
10	10	—	—	West Calder Oil (Limited)	15s.
10	8⅜	17½	17½	Young's Paraffin Light & Mineral Oil (L).	13⅛
				MISCELLANEOUS.	
50	25	5	6	London and Glasgow Engineering & Iron Shipbuilding (Limited)	22½
7	7	15	10	Phospho Guano (Limited)	9
10	10	6	6	Scottish Wagon (Limited)	10⅛
10	4	6	6	Ditto New	80s.

† Interim. ‖ Per share. * For six months of 1878.

NOTE.—The above lists of mines and auxiliary associations are as full as can be ascertained, Scotch companies only being inserted, or those in which Scotch investors are interested. In the event of any being omitted, and parties desiring a quotation for them and such information as can be ascertained from time to time to be inserted in these lists, they will be good enough to communicate the name of the company, with any other particulars as full as possible.

J. GRANT MACLEAN, Stock and Share Broker.

Post Office Buildings, Stirling, October 31.

Meetings of Public Companies.

WESTERN ANDES MINING COMPANY.

An extraordinary general meeting of shareholders was held at the offices of the company, King-street, Cheapside, on Wednesday,

The CHAIRMAN of the company presiding.

Mr. THOMAS JERVIS (the secretary) read the notice convening the meeting, and the minutes of the preceding meeting, which were confirmed. The report and accounts were taken as read.

The CHAIRMAN said the shareholders would have seen from the report of the directors that they were not in a position to declare a dividend at that meeting. It was, no doubt, exceedingly unpleasant to the shareholders to be told that fact, but it was, of course, also very unsatisfactory to the directors to have to make the fact known. Where they in a position to tell the shareholders that operations at the mine had been conducted in the best possible manner, and that all the means and appliances which the directors possessed, or reasonably hoped to possess, had been used, and the mineral raised had been treated by the most scientific principles, and there was no dividend, shareholders might say that the company was a bad speculation, and might be written off as a loss. But the directors were happy to be able to say that that was not the case with their mine, for although they had used all the means in their power still the motive force at the mine was water, and as there had been a severe drought they had lost that, and the consequence was that they could not pay a dividend. They had almost been in the same position as that of a mine worked by steam with its steam-engine broken, which compelled them to wait until it could be repaired before any dividend could be expected. The non-payment of a dividend was not entirely due to drought, because they had that dreadful war which had unhinged everything, and caused them to incur expenses which had not been anticipated. It was hoped, however, that the effects of the war had now been got over, as well as the drought, and that they were now getting into clear water, with a prospect of dividing some of the profits of the mine. Drought was not confined in its effects to any particular undertaking, but it was national and universal, and, as all were aware, had devastated many parts of India and China, and in Australia as many as 9,000,000 of sheep had died or had to be killed in consequence of the drought. The only thing under the circumstances was to wait patiently for better times. The reports told them that the mine was looking as well as ever it did. At one time the superintendent had no place to put the mineral earth when raised, but this difficulty was no longer felt, and the discovery on the Antonio lode seemed to augur very good returns. If this were so, they might fairly hope that they were again approaching smooth water. The profit and loss account showed a loss of something like 900*l*. up to April. That appeared to a rather serious item, but he might tell the shareholders, and he was happy to be able to do so, that during the first four months of the current financial year there had been a profit of very nearly 2000*l*., so that they would be able to strike off the 900*l*. loss and leave over 1000*l*. in hand. This was a hopeful circumstance, and if the same state of things continued—and there was every reason to believe it would—the directors would shortly be in a position to speak about dividends, which they had not been able to do during the past two financial years. The Chairman then moved the adoption of the report and accounts.—Mr. NALDER seconded the motion.

In reply to a remark of Mr. ROBINSON'S, the CHAIRMAN stated that the mine had up to the date of the drought returned a profit of about 54,800*l*.—that was up to the October of 1876. Since that time there had been a loss of 4800*l*., which, deducted from the 54,800*l*., left a clear profit of 50,000*l*. They had an unbroken monthly profit until October, 1876. However, the loss had now been made up, and they had about 1000*l*. to the good.

Mr. G. LONG asked how many years the company had been entirely free from drought, what means the company possessed for the storage of water, so as to prevent a repetition of such a loss by droughts, and whether they had lost many experienced miners through the war, and also whether there was a prospect of their getting similar workmen.

The CHAIRMAN, in reply, said while the mine had been in the possession of this company during the years 1873-4-5, and up to October, 1876, they had plenty of water. Of course the war and the drought were quite exceptional circumstances. It would be exceedingly difficult to deal with the storing of water in such a mountainous district as that in which their mine was situated, where they had sometimes too much water and sometimes too little; but Mr. Brandon, who was going out to the property, was in hopes of being able to make improvements which would have the effect of enabling them to use less water to do the work, and so to economise in that manner. With regard to the labourers, many of the men were taken for soldiers during the war, and those who had not sufficient stomach for fighting ran away, and the company was minus its men. Since the cessation of the war they had got other labourers, but these had demanded the same rate of wages as the other men had received, although they were not as skillful. The men had now, however, got more used to the work.

Mr. BRANDON, in reply to a question, said drought did not generally occur in the same place at closer intervals than ten or twelve years. It would be nearly impossible to store water at the mine, in consequence of the hilly character of the country, and that large masses of stones and boulders frequently fell from considerable heights, and would spoil any works.

In reply to Mr. ROBINSON, the CHAIRMAN said the shareholders had received on their investment an average of 13 per cent. per annum for the whole period of the existence of the company.

The report and accounts were unanimously adopted.

On the motion of Mr. ROBINSON, seconded by Mr. NALDER, the retiring directors, the Chairman, and Mr. Sankey were re-elected. The auditors—Messrs. Rogers and Michael—were re-appointed.

The proceedings then terminated with a vote of thanks to the Chairman and directors.

JAVALI COMPANY.

The ordinary half-yearly general meeting of shareholders was held at the offices of the company, St. Swithin's-lane, on Monday,

Sir LEOPOLD G. HEATH, K.C.B., in the chair.

Mr. E. SCHUBERT (secretary) read the notice calling the meeting.

The CHAIRMAN said he wished more shareholders were present to hear the remarks he had to make, as this was a half-yearly meeting, called in accordance with the request of the shareholders, with the object of enabling the directors, through him, as Chairman, to give such detailed information as they possessed about the property at shorter intervals than was provided for by the annual meetings. It was not very easy to comply with that object, because they now published in the *Mining Journal* very full extracts of each letter as it arrived month by month, so that really the shareholders had almost as much information about the affairs as the directors themselves had. In the report which had been submitted (which appeared in last week's Journal) the directors had added up the monthly returns for the six months under review, and if compared with the corresponding six months of 1877 the comparison was a satisfactory one. The average value realised from each ton was 16s. 8d., against 14s. 7d., whilst the ore crushed had been 11,163 tons, against 8795 tons. This was a large increase in the work done, and the regularity with which that work had been done was shown by the monthly returns, which had induced the directors to confirm the appointment of Messrs. Hennecke and Chambers as joint managers. Mr. Chambers had been a servant of the company over six years; he had been accountant to the company, but during those six years he had mixed himself up much with the executive work of the company under Capt. Sohns, and although not educated as a miner or mineralogist, he had acquired a considerable amount of practical knowledge, and the directors believed he would be a very efficient assistant to Mr. Hennecke. Mr. Hennecke had obtained his degree, and went through the same course of study in Germany as Capt. Sohns, and since he left college had been employed all his life in mining and reducing works; he seemed a most energetic and hard working man, and as far as the directors could judge they thought him thoroughly devoted to the interests of the company. They were very fortunate in having secured his services; he was a capital draughtsman and surveyor, and had sent home very clear and excellent plans. The next paragraph in the report informed the shareholders that after paying every single claim against the company for the six months, including the debenture interest, there remained a clear profit of something over 1300*l*., and the shareholders would like to know what the directors had done with that 1300*l*. In the first place, the directors had paid off the whole of the temporary loan which some of the shareholders were kind enough to advance when the company was hard up two years ago. It was an unsecured debt, bearing only 5 per cent. interest, and he thought those gentlemen who lent the money deserved the thanks of the shareholders, and the directors had much pleasure in returning the loan with 5 per cent. The directors had also cleared off a few bills which were outstanding at the end of the year, and with the remaining amount had built up a small balance at the bankers. At the end of October they had sufficient money to pay the debenture interest due on Nov. 1; they, had paid the costs of the three months' working at the mine, and therefore, they possessed the proceeds of those three months, besides the money at the bankers, so that if they were to be wound-up tomorrow there would be 4000*l*. or 5000*l*. coming from the mine for the three months working, besides the money now in hand. The last paragraph referred to the hope which the directors had of being able to make satisfactory arrangements with the preference shareholders. The directors had taken legal advice on the subject, and that was to the effect that the only way to do what the directors desired to do was to dissolve the company, and start a new one. The board felt that that was unavoidable, besides being costly; but he had had an interview with the lawyers, and the result was that he hoped they would be able to carry out the reduction of capital to the extent of the preference capital by a simple process, which would not depend upon the preference shareholders taking up their fair proportion, and the debenture holders taking up theirs. The preference shareholders had a right to the 2*l*. per share capital which they subscribed, and the accumulated interest, which amounted to another 2*l*., and the thing would go on growing at the rate of 15 per cent. until the directors were in a position to pay off the preference share capital. How far off that might be it was impossible to say, as there was the 1800*l*. of debenture interest accruing every year to take a portion of the profits from it, and it would be for the preference shareholders to say what moderate interest-bearing debentures would, in their view, be equivalent to each very large interest-bearing preference share, with an indefinite period for the payment of it. By the last advices everything was going on well at the mines. The health of the district was suffering from fever, but fortunately the directors sent out three or four months ago a medical gentleman who, they believed, was well fitted for this particular place, as he had served in Ceylon and in many parts of the tropics, and the directors believed he was well fitted to meet these cases of fever. The sending out of this gentleman had been a very expensive business to the company. In former years the Chontales Company, which was within half a mile, divided the cost of the doctors' passage out, and also divided the pay and cost of medicine, &c., but on this occasion the Chontales Company had refused to pay one penny towards sending him out or paying his expenses there. He would read an extract from a letter received from Mr. Hennecke, dated Sept. 5, which was as follows:—

I hope that you received the tracing of my plan of the mine, and that it gave you an idea how our workings are conducted here. Our manto deposit, on the south side of the lode, contains, roughly estimated, about 216,000 tons; on the north side, including the Javali manto, 600,000 tons. The lode east of Pollock's tunnel, including the Nispero and Esperanza, to the level of Javali river, contains 143,180 tons; the Socorro, down to the same level, 330,380 tons; the manto deposits, on the Concepcion, 120,000 tons; the Concepcion lode about 100,000 tons; in all, about 1,519,560 tons, which would give to our mill, taking as a basis the present crushing power of about 22,000 tons a-year, a supply for about 68 to 70 years, without exhausting the mine entirely, as we can always go deeper, the only difficulty then arising is to hoist the ore and pump out the water, which at present does not trouble us at all. All our levels and shafts are on the lode with the exception of a few, which serve only for communication and as ventilation. You will understand this better when you look into the formation of the socorro, to show which I enclose you a sketch of a section made through the Laken shaft.

I think that the square stamps we have here would do very well if they were erected in the tailings mill; it would not cost much to erect them there, and no great alterations are needed. I send you a sketch of the tailings mill to show you my idea. It is only necessary to take the upper blanket boards away, and put the stamps up there. The mine Esperanza is close at hand, only 108 feet distant; the water power is in the wet season sufficient to run even eight stamps, but I only propose to try it at first with four. The tailings could be conducted through the mortar box, and stamped with the quartz from the Esperanza over again, and afterwards worked in the pans. I feel quite certain that it would pay. The old frames of the square stamps are, of course, of no use whatever. They are rotten and eaten up by the wood ants, being made of pine; but these can be made new from strong durable timber at very little expense. The only fault with the square stamps is that they have no closed mortar boxes, but these can be obtained from England. To erect these stamps at the foot of the socorro, near the Carmen Creek, would be a very good thing, too; the only drawback is that the water-power does not belong to us, but I have not the slightest doubt but this can be easily obtained. The manto lays very deep on the hill, and it would cost a great amount of money to carry it down to our present mill. In the course of the present month I will survey and level the Carmen Creek up to our boundary, and look out for a good mill site. We have three sets—12 square stamps lying idle, and we could erect them (say), eight on the Carmen Creek, and four in the tailings mill, with very little cost, and I am quite certain that in less than a year they would pay.

As regarded the putting up of the stamps referred to, the Chairman said that at present it was only a project; they could be erected at a little cost, and the directors had asked for drawings, and if it was done at all it would not be done for several months. In conclusion, the Chairman moved the adoption of the report and accounts.

Mr. R. G. HALL seconded the resolution, which was put to the meeting, and carried without any discussion.

On the motion of Mr. YOUNG, seconded by Mr. WILDE, a vote of thanks was passed to the Chairman and directors, and the meeting broke up.

ABERLLYN MINING COMPANY.

A statutory meeting of shareholders was held at the offices of the company, Gracechurch-street, on Thursday,

Mr. J. Y. WATSON, F.G.S., in the chair.

Mr. C. B. PARRY (secretary) read the notice calling the meeting.

The CHAIRMAN stated that this was a statutory or mere formal meeting, but a report from the agent would show all that had been done from the commencement of the company, and that the prospects of success then entertained had increased rather than diminished. The agent then estimated that on the erection of the necessary machinery he hoped to be able at the end of 12 months from commencement to make a profit from blende alone of 2000*l*. a year, although the main object was lead, which seems to be coming in. Contracts, as you will see by the report, have been entered into for all necessary machinery, trams, inclines, &c., and the agent calculates in one piece of ground alone we may reckon upon 12,000*l*. of blende. This is between the shallow and middle adits, and in the latter the lode continues 12 ft. wide, and worth 7 to 8 tons per fathom. It only remains to be said that the whole of the working capital has been subscribed. He would call upon the secretary to read the captain's report:—

Oct. 29.—The following is a report of the operations since the commencement:—

Deep Adit: We have cleared and secured 100 fms. of levels here; the greater part of this has been timbered. We have also laid down, including the distance to the tip, over 100 fms. of rails, making a good substantial tramway. Near one of the faces of the level we found an old rise about 4¼ ft. high, which, if continued, would strike the run of blende in the middle adit, and effect a good communication for throwing down the blendestuff for transit through the level to the dressing floors. With a view to this I have put the men to continue this rise, which I expect to finish by the time we have the dressing department ready.

Middle Adit: We have driven here about 4 fms.; the latter 2 fms. have been driven on one side of the lode only. The lode, being over 12 ft. wide, is too much to carry for our present purpose; the lode is quite as rich for bleode as when the directors saw it, and occasionally we have had fine stones of lead, showing that it is a lead as well as a blende-bearing lode. The blende now on the footwall of the hard lode partakes of the same physical character as the blende in the shale lode, similar to copper glance, producing from 50 to 60 per cent. of zinc. I purpose shortly to put a pare of men to sink a winze opposite to the cross-cut from the shale part of the lode, in order to communicate wtih the rise from the deep level, which will open stopes here. We have cleared a cross-cut at this level, driven west about 50 fms. In the face the character of the ground is very much changed, and it appears that a lode is near. At some future time I shall propose extending this cross-cut a little further to see what there is, as the ground is very congenial for the production of lead.

No. 1, or Shallow Adit: We have cleared out the level here on the hard lode, or rather the level is driven on the face of the hard lode. Perpendicular to the face of the end on the blende at No. 2 level (middle adit) we have opened the level, and have now commenced sinking so as to get a communication and open stopes between these two levels. This winze is now on the face of the lode on the hanging side, and from its appearance I am led to believe that the lode is as rich as it is in No. 2. When we have a communication here we shall have a fine stope of blende for 12 ft. wide and 7 fms. high, and no doubt it extends to the small shafts behind the farmhouse, as the same characteristic blende is there, a distance of 30 fms.; and assuming that it reaches to surface we have, from No. 2, 20 fms of back. I think in this piece of ground alone we may reckon upon 4000 tons of blende, equal to 12,000*l*. I consider that the future prospects of this mine are all that anyone could reasonably expect or desire. I cannot but think that this large course of blende is a precursor of as large or larger course of lead; this idea is not based upon a mere stretch of imagination, but is agreeable with all mining experience, and, therefore, a natural deduction of reasom from a common principle. If, in addition to this, we add other features—the configuration of the surface between the lake and the shallow adit—we are led to the same conclusion, in confirmation of which the deep adit level which is driven shows good faces of lead as it approaches this point, and on another part of the shale lode the old workers raised and sold a quantity of lead.

Surface- By the advice of the directors a short time 'go I let as much as possible of the surface work by contract, including the cart-road, about 300 yards, the ore yard at the bottom of the incline, the incline cutting, the rock for the erection of the drum, the tramway from the incline to the dressing-floors, and the building of the wheel-pit and crusher-house; the whole of this work will be completed in six weeks more. In the meantime the crusher is being made, and according to agreement will be delivered at Llanrwst or Bettws-y-Coed station in four weeks more. By that time I hope to get the incline and drum and tramway to the dressing-floors ready so as to get them on the mine at once, and be ready for erection as soon as the building is ready.—J. ROBERTS.

Mr. DAUKES said that considering the short time they had been at work on the property he thought the shareholders had every reason to be satisfied with the progress which had been made. He had visited the mine recently, and everything which Capt. Roberts had suggested with regard to the development and working of tne mine seemed to be of a thoroughly practical character, and the engineering work left nothing to be desired. The contracts for the road seemed to be let on very reasonable terms, and very little in excess of the approximate estimate which Capt. Roberts previously mentioned. The walls of the old farm house, adjoining, seemed to be built of rocks of blende.

The CHAIRMAN remarked that the builders of the farm house did not know the value of the material they were using.

Mr. SPENCE said there was no doubt the report looked very satisfactory for the future of the mine.

Mr. DAUKES said that one most important feature was the great economy with which the mine could be worked; the water supply was unfailing, and there was no doubt that when the works were completed the ore could be converted into a marketable state at a price more economical than could be seen in almost any other mine. The roads from the mine were all down hill, and offered the utmost facilities for the transport of the ore, and for moving the heavy material with as little labour as possible.

In reply to an observation, Mr. PARRY said he believed that the whole of the surface work could be completed, and the machinery erected, for about 600*l*.

The CHAIRMAN corroborated the remark of Mr. Daukes as to the enormous supply of water, and said he believed that they would be in full working order for less than the sum of 1000*l*., which was the original estimate. His own belief was that it would make one of the greatest mines in the district. (Hear, hear.)

The meeting then broke up.

WHEAL CREBOR.—At the meeting held on Thursday (Mr. J. Y. Watson, F.G.S., in the chair) the accounts presented showed a loss of 477*l*. 18s. 10d. on four months' working, and a debit balance of 272*l*. 11s. 8d. to September 29. The ores sold, 223 tons, realised 565*l*. 5s. 8d., and but for the low price of copper they would have realised a profit far exceeding their present debit balance. No call has been made for seven months, but the committee do not see how a call of 1s. 6d. per share (450*l*.) can be avoided now. The fall in copper is militating very much against the mine, and the only redeeming feature in the report is the improved appearance of the 120 fm. level east, or bottom level. The above loss of 477*l*. 18s. 10d. includes 183*l*. charged to machinery and dead cost at new shaft. The accounts were then passed, and a call of 1s. 6d. per share made, payable on the 16th.

WHEAL BASSET.—At the adjourned meeting on Tuesday (M. R. R. Broad in the chair) it was stated by Mr. Martyn that he had addressed letters to the managers of South Wheal Frances, West Basset, and West Frances Mines having reference to the heavy water charges at Wheal Basset. It was stated in reply that although generally the representatives of South Wheal Frances, West Frances, and West Basset thought it unreasonable to ask them for any contributions towards the water charges of the neighbouring mines, as they had difficulties of their own to contend with, still a disposition was shown to contribute provided Wheal Basset could not be carried on without assistance. Considerable improvement, however, had been reported at Wheal Basset, and it was felt that the circumstances were quite altered. Capt. Hosking (Mr. Basset's mineral agent) had gone over the

mine, and he considered the improvement an important one. He thought it would enable the adventurers of Wheal Basset to avoid asking for any assistance, and Mr. Bolden hoped that Capt. Hosking's expectations would be realised. Mr. Martyn considered the opinion of the managers of South Frances, West Basset, and West Frances Mines was that they ought not to be called upon to render any assistance; still, rather than the mine should be stopped, they might, perhaps, be prevailed upon to render some assistance, although it was held in abeyance for the present, in consequence of the report of Capt. Hosking. The improved state of the mine did not, he thought, alter their position in the least with regard to their being entitled to consideration for the pumping of the water from the abandoned mines. He considered they were justly entitled to some consideration for the pumping of that water, which had been thrown upon them by the stopping of some of the adjoining mines, and the neighbouring mines were indebted to the adventurers of Wheal Basset for what they were doing to get rid of the water. It was subsequently resolved to renew the application.

WEST TOLGUS.—A two-monthly meeting of shareholders was held at the mine account-house on Tuesday (Mr. R. Taylor, F.G.S., in the chair). The accounts showed a profit of 515*l.*, which made the total credit 1813*l.* A dividend of 1*l.* per share was declared, and 1302*l.* carried forward. The agents presented a favourable report, in which they stated that the boring machine was a great advantage. A boring machine—Loam's air compressor—and a pneumatic engine are now in use in the mine.

SCOTTISH AUSTRALIAN MINING COMPANY.

The half-yearly general meeting of shareholders was held at the Cannon-street Hotel on Wednesday,

Mr. A. W. YOUNG, M.P., in the chair.

Mr. CHARLES GRAINGER (the secretary) read the notice calling the meeting.

The CHAIRMAN said he thought the shareholders would consider the report a good one. The great article they dealt in—coal—there had been an increased demand for, and 20,200 more tons had been sold in the half-year, as compared with the previous half-year; the average sale used to be 14 000 or 15,000 a month, so they were now more than one month in advance. This strengthened the belief that the coal was liked in the East, and did the service which good coal was expected to do, because the whole of this time they had had cheap coal in England, and also cheap freights, which were the two things they had to watch at present. If they could hold their own in times like those which they had gone through, he could hardly imagine that any time would arise when they would not be able to find a good vend for their coals in Australia. With regard to competing articles, one small colliery had been opened during the past half-year; on the other hand, one had ceased to work, and, therefore, they were very much in the same position in that respect. There was not much encouragement for opening up new collieries there, as those already in existence could supply a considerably larger quantity of coals if they had opportunities of selling it. As regarded the profits made during the half-year, the profit per ton had been slightly greater than in former years, or, rather, comparing it with the corresponding half of 1877. They had received a little less money in the half-year; but, on the other hand, they had spent rather less; and, as the fixed charges were much the same, the increased vend had given a slightly increased profit per ton. The directors had not stinted the colliery in any respect, and whenever Mr. Morehead, the manager, and Mr. Croudace, the colliery viewer, had recommended the directors to do anything they acted upon their advice. Some wagons were about to be sent out, the directors thinking it a good time to purchase now iron was cheap. Mr. Croudace had been in England, and had now returned; during the time he was here he employed himself very much in looking over collieries in this country, and seeing the mode in which they worked, and there was no doubt the experience thus gained would be useful to the company in the future. The directors were very much satisfied with everything he had done, and were unanimous in thinking Mr. Croudace an excellent man to superintend the affairs out there. And now a word with regard to what they were likely to do in the current half-year, and upon this point he was happy to be able to congratulate them, inasmuch as four months out of the six had transpired, and no news had been received of any reduction in the price of coal. It had been a standing order from the directors that telegraphic news should be received when any drop took place in the price of coal, and as no such telegraphic news had been received the directors concluded they had been obtaining the same prices for those four months, and there was no reason to suppose there would be any disturbance in that respect. As regarded the working of the two months of which the directors had now received information—that is to say, the two winter months of July and August he was glad to report that 14,400 tons more had been sold in the two months; in other words, they had sold in two months the quantity which they usually sold in three. He was bound to tell them that the last September report, although it did not bring the exact figures, did say that the harbour was not full of ships, and that trade was rather slack generally. He wished he had nothing less satisfactory to talk about than the coal, but he must say a word regarding the copper property in the Dee side up in Queensland, which had to be stopped, and the expenses there were nothing more than the expenses of a caretaker. The Cadia property, which was more advanced than the other, although not fully developed, had been going on, as the directors hoped, paying expenses, but the terribly low price of copper had beaten them, and there was a small charge of 500*l.* against the company on that account for the half-year. The directors could not see their way, without considerable expenditure, to sufficiently test it to know whether they had a good mine or not. They knew that a great deal of rich copper had been taken out, but a shilling expenditure had never produced a shilling in return. Copper which some time ago was 90*l.* per ton was now as low as 60*l.*, and he was not in favour of spending more money when copper was at the present low price, but possibly when copper went to a better price it would do to go on with the works. In the meantime they had to face the fact that they had spent a good bit of money on those two properties, and if it was not that they had a reserve fund, which the company were now considerably increasing, and likewise that they had properties which, if the present times were worth anything, must greatly exceed the value set against them in the books, the directors would be inclined to advise the shareholders to take less dividend and pay this off. But the directors did not think it necessary to do that, as they had a reserve fund of 21,000*l.*, which was being largely added to every half year, and if they looked at the profit, and took the lowest estimate of the Lambton properties, which produced in round figures 36,000*l.* a year, and stood against the company at 80,000*l.*, they might fairly set down and put to that a sum of money which would repay all the loss, and keep the reserve fund intact. There was no doubt that in the copper property they had made a bad investment, and it was well that the shareholders should know it. As regarded the land which was at Newcastle, about which some shareholders had been anxious, he was always certain it would turn to something, and during the currency of the half-year they had sold under a quarter of an acre, for which they had got 560*l.*, and since then Mr. Morehead had sold 2¼ acres for 5500*l.*, and received the money. They had, therefore, parted with about one-fourth of their land there, and although the portion that had been sold might possibly be the select portion, yet there was no doubt that the buildings which would be erected and the trade which would be carried on there would make the remaining land worth fully as much. The whole of that land stood in the books of the company at 11,000*l.*, and about one fourth had been sold at 6000*l.* In conclusion he (the Chairman) moved the adoption of the report and accounts, and the declaration of a dividend at the rate of 1s per cent. per annum, payable on and after Thursday, November 7.—Alderman Sir CHARLES WHETHAM seconded the resolution.

In reply to remarks by Mr. FREWER and Mr. BOULTON, both of whom congratulated the directors on the satisfactory character of the report,

The CHAIRMAN said he did not look upon the copper property as a bad investment, except in the sense that they had spent a good deal of money upon it which had as yet made no return, and they must look to the future as to whether it it really turned out to be a good investment or not. He did not despair of its becoming a good property, provided there was an improvement in the price of copper. With regard to the excellent quality of the coal, he might mention that a vessel which recently made one of the fastest passages on record used the coal supplied by this company. There was plenty of coal on the property, and no one in that room would live to see the end of it. (Cheers.)

The report was then adopted.

On the motion of Mr. FREWER a cordial vote of thanks was passed to the Chairman and directors, and the meeting broke up.

[For remainder of Meetings see to-day's Journal.]

THE ABERCARNE COLLIERY ACCIDENT.—At the Mansion House, on Monday, a conference was held between the Lord Mayor and the Mayors of Manchester, Liverpool, Cardiff, and Newport, Colonel Lyne, and others, on the subject of the various funds now being collected in London and throughout the country for the relief of the sufferers by the recent dreadful colliery accident at Abercarne, in Monmouthshire. The subscriptions were stated to amount in London to 30,508*l.*; Liverpool, 2000*l.*; Manchester, 5900*l.*; Cardiff, 2250*l.*; and Newport, 14,870*l.*; or 55,500*l.* in all; whereas the requirements of the widows, orphans, and aged relatives were estimated at 50,344*l.* It was resolved, in these circumstances, that all the funds should be closed at the end of the present month. It was further agreed to invest the money in the names of nine trustees, who had power, when every legitimate claim on behalf of the Abercarne sufferers had been satisfied, to deal with the surplus for kindred purposes. Provision was made for a due audit of the trust and other funds. In the course of the conference it was stated that a meeting was being held that day at Cardiff towards the formation of a Miners' Permanent Relief Fund in South Wales and Monmouthshire, and that the scheme was being most favourably considered both by masters and men. At the instance of the Mayor of Newport (Monmouthshire) the cordial thanks of the local committee were accorded to the Lord Mayor for the assistance he had rendered the sufferers by opening a fund at the Mansion House. The net result of the musical festival at the Brighton Aquarium on Oct. 21 is the addition of 68*l.* 15s. to the Abercarne Colliery Explosion Fund.

WATER PRESSURE ENGINES.

Some improvements in the mode of actuating the valves of steam and water pressure engines have been invented by Mr. ARTHUR WHALLEY, of Earlestown, Lancashire, which also relates to means of adjusting the pause at each end of the stroke of a pumping-engine to suit its working to the flow of water in the pumps; the means employed being made to regulate the admission of steam to suit every variation of its load, and in case of the whole load being suddenly thrown off the valve is reversed, and steam admitted to the opposite end of the cylinder, thus preventing the piston colliding with the cylinder covers, and ensuring against accident. The arrangements are applicable with ordinary slide-valves, but in the larger engines he prefers to use double-beat Cornish valves. For working the slide-valve of a horizontal engine a subsidiary steam cylinder and a cataract cylinder—the same piston-rod being common to both pistons—are placed on a frame carried by any convenient part of the engine. The cataract cylinder is provided with a port governed by an adjustible plug for the passage of liquid from one end of the cylinder to the other. The piston-rod of the cataract and subsidiary pistons is jointed to the long arm of a vertical double lever, the short arm of which is attached to the main slide-valve by means of a link. The fulcrum of this double lever is carried by the short arm of a pair of vertical levers, the long arm of which extends downwards, and is connected with the piston-rod of the main cylinder by means of a link or other arrangement. The fulcrum of this pair of levers is carried by a bracket attached to the subsidiary and cataract cylinders.

The subsidiary cylinder is provided with a separate valve chest and slide valve, which valve obtains its motion by means of tappets actuated by the levers attached to the main piston-rod. As the main piston makes its stroke the long arm of the levers connected thereto is carried with it, the short arms above moving in the opposite direction, in time with (but much more slowly than) the main piston, and carrying with it the fulcrum of the double vertical levers attached to the main slide rod, and to the subsidiary piston-rod, thus moving the main slide valve slowly in the direction opposite to that of the main piston, and cutting off steam. As the main piston approaches the end of its stroke the slide valve of the subsidiary cylinder is reversed (by the tappets actuated by the lever attached to the main piston-rod), thus admitting steam to one end thereof. The subsidiary piston and the vertical double levers attached thereto are, therefore, propelled with a speed regulated by the resistance of the liquid in the cataract cylinder to the piston thereof, which is on the same rod. By the movement of these levers the main slide valve is shifted, and steam admitted to the main cylinder at the end which the main piston has reached, thus causing it to make its return stroke. It will be readily understood from the above description that the admission of steam to the main pistons is effected by the subsidiary cylinder, whose speed is governed by the cataract, thus naturally determining the speed of the engine, while the cut-off or expansion is effected by the engine itself. There are other arrangements which may be substituted for that just described, but the principle involved is the same.

When a greater degree of expansion is required he uses a special form of expansion valves. He makes the main slide valve with ports, and works the expansion valves on the back thereof. He carries the rod for the expansion slides through both ends of the valve chest, and to one end joints the long area of a vertical lever, which he pivots upon a centre carried by the main slide rod, the short arm extending downwards being provided with a slot carrying a movable stud attached to the connecting rod actuating the sliding block. By these means the expansion valves are made to move for the admission of steam at the same time and in unison with the main slide, but are put back with a greatly accelerated speed, thus causing an early cut-off. By altering the position of the stud in the slot the expansion can be varied to any grade. In the arrangements described a pause will be caused at the end of each stroke of the engine, equal in duration to the time required by the subsidiary piston to move the main slide over its lap, but where it is necessary to have a pause of longer duration he makes the valve chest of the subsidiary cylinder circular at the ends, and forms a small piston on each end of the slide valve, steam being admitted to these pistons by means of a subsidiary slide valve, which is actuated by tappets from the main engine, as before described. He then connects the rod of the main slide valve of the subsidiary cylinder to the piston of a subsidiary cataract formed on the back of the main cataract cylinder, and regulates the flow of the liquid by means of a screw. It will thus be seen that when steam is admitted to the pistons of the subsidiary slide valve, that valve must move with a speed regulated by the subsidiary cataract, thus causing the slide valve of the main engine to open sooner or later, and the main pistons to make a shorter or longer pause at each end of their stroke. Apparatus similar to that described above is applicable for working the slides of engines actuated by water pressure and for regulating the pause at the end of each stroke of such engines, as may be readily understood, the apparatus for working the expansion valves being in such engines dispensed with.

MANUFACTURE OF IRON AND STEEL.

In carrying out his improvements of November and January last Mr. S. G. Thomas, of Battersea, finds that various other basic mixtures may be advantageously used as the material for forming the lining of the Bessemer converter, and the interior of the furnace employed in the open hearth processes for the manufacture of steel or cast malleable metal, so as to enable a basic slag in which phosphorous is removed to be produced. Thus he finds that blast-furnace slag or ore-furnace copper slag, or clay, or Portland cement, or other similar hydraulic cements, or the natural silicates of magnesia or borax, when ground up with limestone, give it sufficient tenacity to form a satisfactory basic lining or fire-brick without materially diminishing its refractory character. Carbonate of magnesia, magnesia, magnesian limestone, or carbonate of baryta may sometimes be substituted for limestone. Certain natural limestones which contain a considerable proportion of silica or of silica and alumina, such as lias limestone and other hydraulic limestones, may be ground up and sometimes used without any admixture, though it is generally desirable to add a little silicate of soda.

Ordinary lime or limestone cannot be successfully used by itself on a commercial scale. If so much silica is present in a hydraulic limestone as to make it non-refractory it should be mixed with a purer limestone before being used. He finds a mixture of 86 parts of limestone, 8 or 9 of glassy blast-furnace slag, and 5 of silicate of soda solution, a good one. Though silicious substances may be advantageously used as a binding material only a small quantity should be used, and the total silica present in the mixture should not exceed about 10 or 12 per cent. as a maximum.

The tuyeres used in the converter he makes of approximately the same materials as the lining. Thus he finds a mixture of 85 parts of ground limestone, with 10 parts of clay and 5 of a solution of silicate of soda, makes an excellent tuyere. He also makes tuyeres of a mixture of limestone and oxide of iron in the proportion of from 2 to 4 parts of oxide of iron to 100 parts of ground limestone. The ladle into which the converted metal is tapped should be lined with one of the basic mixtures described. The mixtures may, in all cases, either be rammed into an iron casing, or they may be made into bricks before being used. The bricks, and also the tuyere, should be well burnt before being used, having been previously dried at a low heat.

WELDLESS BOILER RINGS.—To produce a ring without weld or joint, the section of which is commonly known as angle iron, for the purpose of securing the shells and furnace tubes of boilers to the endplates, Mr. JOHN FURNESS, of Huddersfield, proposes to take either a slab of iron or of steel bloom, and manipulate the same whilst heated into circular a plate. He then makes a hole through the centre of the plate, and expands the same to such a diameter that the plate will pass on to the rollers of a tyre rolling mill, and is thereby worked out, and expanded to the diameter and section required.

WHEAL JANE.—At the meeting last week, Capt. Southey said they had plenty of uphill work in the mine during the past two years, and not only in uphill work in the erection of machinery, but in the exceedingly low price of tin. He then referred to the fact that if tin had remained at 42*l.* a ton, the same as when he took the management of Wheal Jane, they would have paid costs, and notwithstanding the decrease in the price of tin, they had paid costs and a little more. At the same time he did not want to rest satisfied with that; he was one of those who "go in" for improvements, and as far as possible he was carrying them out. After a few other remarks he concluded by saying that he hoped the time was not far distant when they would be able to meet costs even with the present low price of tin.

PARIS EXHIBITION, 1878.

GOLD AND SILVER MEDALS AWARDED
for Steam-Engines and Boilers, also the Special Steam Pump with Holman's Condenser and Compound Pumping Engine.

TANGYE BROTHERS AND HOLMAN,

HYDRAULIC AND GENERAL ENGINEERS,
CORNWALL HOUSE, 35, QUEEN VICTORIA STREET, LONDON, E.C.,
AND BIRMINGHAM, (TANGYE BROTHERS), CORNWALL WORKS, SOHO.

The "SPECIAL" DIRECT-ACTING STEAM PUMP,
WITH
Holman's Patent Self-acting Exhaust Steam Condensers.

UPWARDS OF 12,000 "SPECIAL" STEAM PUMPS ARE IN USE.

After eight years of successful application for all purposes to which steam-driven pumps can be applied, THE "SPECIAL" STEAM PUMP STILL MAINTAINS THE FIRST POSITION IN THE MARKET, notwithstanding that it alone—of all direct-acting pumps—has been subjected to the great variety of severe tests that must be encountered in such a period of time. Some valuable improvements have been suggested in the course of a long experience, and their adoption has rendered the apparatus at once the simplest and most certain in action. There is absolutely no extraneous gear, and the steam cylinder is *no longer than the pump*. The valves are of easy access, and are suited for pumping fluids and semi-fluids of almost any consistency.

Holman's Condenser

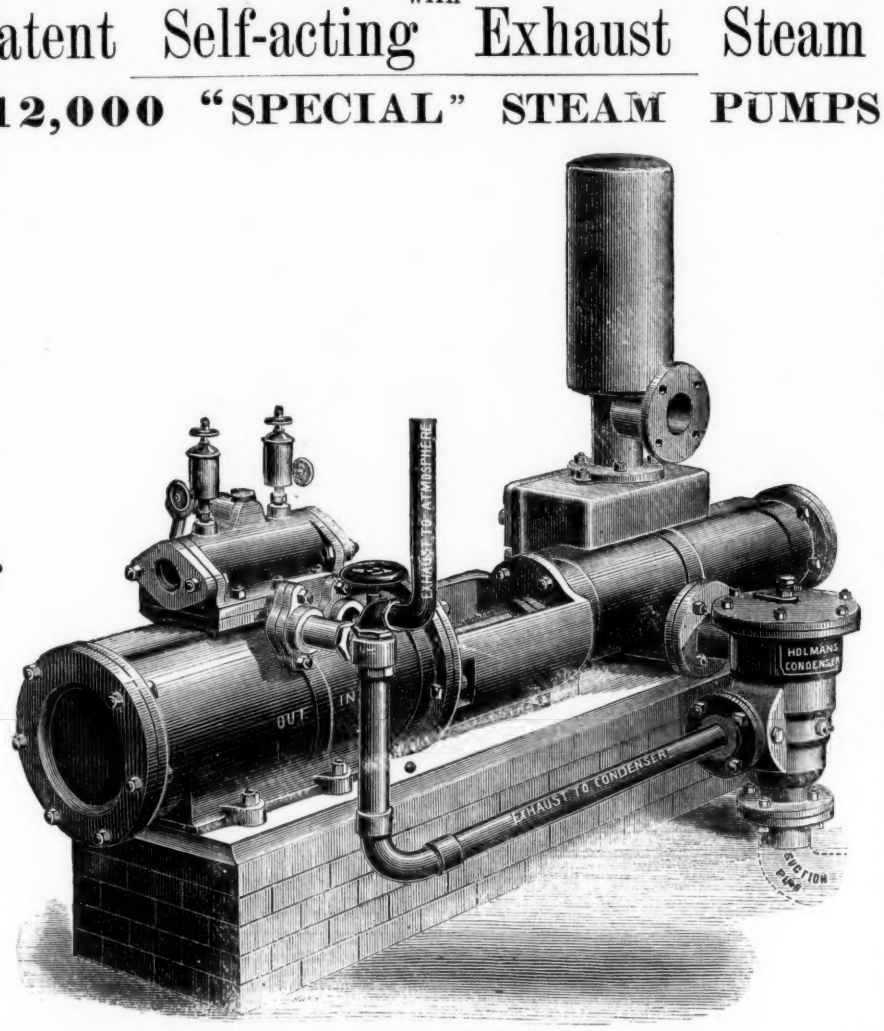
TURNS WASTE STEAM INTO GREAT POWER.

SAVES HALF ITS COST IN PIPES AND CONNECTIONS.

PREVENTS ALL ESCAPE OF STEAM IN MINES OR ELSEWHERE.

REQUIRES NO EXTRA SPACE.

SAVES TWENTY TO FIFTY PER CENT. OF FUEL.



WILLIAM ELLIOT, Esq., *of the Weardale Iron and Coal Company, writes under date Sept. 17th, 1875, as follows:*—"We have now THIRTY-FIVE of your SPECIAL STEAM PUMPS in operation at the various collieries under my charge—some of them employed pumping water out of our pits to the depth of 50 fms.—others employed in the pits, and a good many feeding Boilers. I have no hesitation in saying that we have found them the Cheapest and Best Pumps of the kind we have tried. I can with confidence recommend them to intending purchasers."

Messrs. BURT, BOULTON, and HAYWOOD, *Chemical Manufacturers, of London*, have FORTY of the "SPECIAL" STEAM PUMPS in use at their works.

HOLMAN'S CONDENSERS

Are made to suit any size and kind of Steam Pump. They form a part of the suction pipe of the Pump, and while they effectually condense the exhaust steam they produce an average vacuum of 10 lbs. per square inch on the steam piston, increasing the duty of the Engine, and effecting a saving in fuel of from 20 to 50 per cent.

In Mining operations these Condensers will be of great value.

All Boiler Feeders are recommended to be fitted with these Condensers, as not only is the exhaust steam utilised in heating the feed water, but is returned with it into the boiler.

GREAT REDUCTION IN PRICES.

The following sizes are suitable for low and medium lifts:—

Diameter of Steam Cylinder ...In.	3	4	4	4	5	5	5	6	6	6	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10
Diameter of Water Cylinder ...In.	1½	2	3	4	3	4	5	3	4	5	6	3	4	5	6	7	4	5	6	7	8	5	6	7	8	9	5	6
Length of Stroke .....In.	9	9	9	9	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	18	12	12	12	18	24	12	12
Gallons per hour	680	815	1830	3250	1830	3250	5070	1830	3250	5070	7330	1830	3250	5070	7330	9750	3250	5070	7330	9750	13,000	5070	7330	9750	13,000	16,500	5070	7330
Price of Special Pump ...£	**16**	**18**	**20**	**25**	**22 10**	**27 10**	**32 10**	**25**	**30**	**35**	**40**	**30**	**35**	**40**	**45**	**50**	**40**	**45**	**50**	**55**	**65**	**50**	**55**	**60**	**70**	**85**	**55**	**60**
Extra, if fitted with Holman's Condenser and Blow-through Valve	£7	£7	£9	£11	£8 10	£11 10s	£12 10s	£9	£12	£15	£15	£10	£13	£15	£16	£22	£13	£16	£16	£22	£22	£16	£16	£23	£24	£35	£17	£17

CONTINUED.

Diameter of Steam Cylinder..In.	10	10	10	10	12	12	12	12	12	12	14	14	14	14	14	14	16	16	16	16	16	18	18	18	18	18	18	18
Diameter of Water Cylinder..In	7	8	9	10	6	7	8	9	10	12	7	8	9	10	12	14	8	9	10	12	14	9	10	12	14	16	10	12
Length of Stroke .....In	12	18	24	24	18	18	18	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Gallons per hour	9750	13,000	16,519	20,000	7330	9750	13,000	16,519	20,000	30,000	9750	13,000	16,519	20,000	30,000	40,000	13,000	16,519	20,000	30,000	40,000	16,519	20,000	30,000	40,000	50,000	30,000	40,000
Price of Special Pump..£	**65**	**75**	**90**	**100**	**75**	**80**	**85**	**110**	**120**	**140**	**110**	**120**	**130**	**140**	**160**	**180**	**140**	**150**	**160**	**180**	**200**	**180**	**190**	**210**	**220**	**240**	**210**	**220**
Extra, if fitted with Holman's Condenser and Blow-through Valve	£23	£24	£35	£35	£20	£27	£27	£38	£38	£50	£28	£28	£40	£40	£55	£55	£28	£40	£40	£55	£55	£45	£45	£56	£56	£70	£56	£56

Intending purchasers of Steam Pumps would do well to observe the great length of stroke, short steam cylinder, and short piston of the "Special" Steam Pump, as compared with the short stroke, long steam cylinder, and long piston of the Pumps of other makers, as the efficiency and durability of the machine, and the space occupied by same, greatly depend upon this. The advantage of long strokes will be obvious when purchasers are reminded that each set of suction and delivery valves of a "Special" Steam Pump with 24 in. stroke, running at 120 ft. per minute, would open and close only 30 times per minute, as against 120 times per minute in a Pump with only 6 in. stroke performing same duty.

The "Special" Steam Pump can be worked by Compressed Air as well as by Steam.

HUNDREDS of these PUMPS are USED for HIGH LIFTS IN MINES, for which purpose they are made with 21, 24, 26, 28, 30, and 32-inch Steam Cylinders, and 36 48 and 72-inch Strokes.

The following Testimonial gives one Example of the Power Gained by the action of Holman's Patent Condensers:—

NORLEY COLLIERY, WIGAN.

MESSRS. TANGYE BROTHERS AND HOLMAN.

GENTLEMEN,—I have great pleasure in recording my entire satisfaction with the working of the Holman's Patent Steam Pump Condenser which you have supplied to us. The complete condensation of the steam is, apart from its value in the strict economic sense, a most valuable feature in the drainage of underground workings. The perfect manner in which this important result is accomplished by your Condenser is extremely creditable to you, and merits the thanks and commendation of the Mining Engineer. When we start the "Special" Steam Pump the Condenser commences working automatically, and maintains a constant vacuum of 10¾ lbs. per square inch, even when we run the Pump upwards of 80 strokes (106 feet) per minute. It may perhaps be interesting to you to know that when we were running the Pump at 84 strokes (168 feet) per minute, the steam gauge indicating a steam pressure of 36 lbs. per square inch, 60 yards from the Pump and the Condenser vacuum gauge on the exhaust pipe indicating a steady vacuum of 21½ inches, I turned the exhaust steam from the Condenser into the atmosphere, when the speed at once fell to 44 strokes per minute. The working economy thus shown is really so great that the cost of the Condenser must be saved in a very short time.

(Signed) J. THOMPSON.

NORTH OF ENGLAND HOUSE ... ... TANGYE BROTHERS, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.
SOUTH WALES HOUSE... ... ... TANGYE BROTHERS AND STEEL, Tredegar Place, NEWPORT, Mon.; and Exchange Buildings, SWANSEA

Printed by RICHARD MIDDLETON and published by HENRY ENGLISH (the proprietors) at their offices, 26, FLEET STREET, E.C., where all communications are requested to be addressed. November 2, 1878.